Chhetri Academy

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GCSE MATHS

Probability

Edexcel 1MA1 | Subtopic collection Topic 52

Probability and relative frequency

Foundation tier

Answers and examiner comments

116	2010-2025	Foundation
question groups	available papers	tier

Using this booklet

1. Answer numbers match the companion question booklet.
2. Follow the original question number on marking tables.
3. Examiner comments are included where available.

Name _____ **Date** _____

Some entries use full source marking material in an appendix. Any unavailable mark schemes are identified beside the relevant answer.

4	(a)		unlikely	1	B1 cao
	(b)		even	1	B1 cao
	(c)		impossible	1	B1 cao
	(d)		e.g. blue, blue, blue	1	B1 for two or three ‘blue’ and no ‘red’

Question	Working	Answer	Mark	Notes
4 (a)		4	1	B1 cao
(b)		Mark and Lori	1	B1 cao (accept M and L)
(c)		$\frac{2}{6}$	2	M1 for $\frac{2}{n}$ where $2 < n \leq 6$ or $\frac{n}{6}$ where $n<6$ A1 for $\frac{2}{6}$ oe (condone incorrect cancelling) [SC: B1 for 2 out of 6 or 2 : 6 or 2 in 6 or 1 out of 3, etc. if M0 scored]

5	(a)		× at $\frac{1}{2}$	1	B1 for × marked at $\frac{1}{2}$ cao (allow the × above or below the line)
	(b)		× at $\frac{1}{4}$	1	B1 for × marked at $\frac{1}{4}$ (allow the × above or below the line) [Tolerance: the × must be between the 'l' in the word 'probability' above and the 'a' in the word 'scale' above]
	(c)		× at 0	1	B1 for × marked at 0 cao (allow the × above or below the line)

5MB1F_01

Question	Working	Answer	Mark	Notes
13		0.06 or 6%	2	M1 for 1 - (0.09 + 0.18 + 0.16 + 0.21 + 0.30) oe OR M1 for 100 – (9 + 18 + 16 + 21 + 30) oe OR M1 for $1 - (\frac{9}{100} + \frac{18}{100} + \frac{16}{100} + \frac{21}{100} + \frac{30}{100})$ A1 for 0.06 or 6% (6 only gets A0) or $\frac{6}{100}$ oe [SC; B1 for 6 on the answer line without working, if M0 scored]

Question	Working	Answer	Mark	Notes
4 (a)(i)		Impossible	1	B1 cao
(ii)		Certain	1	B1 cao
(b)		1A 1B 1C 2A 2B 2C 3A 3B 3C	2	B2 for all 9 correct outcomes, with no extras, ignoring repeats. Note: these could be in a table (B1 for at least 6 correct outcomes) (SC B1 for 6 correct combinations for spinning Steve's spinner twice: AA AB AC BB BC CC ignoring repeats)

8		$\frac{5}{24}$ oe	3	B3 for $\frac{5}{24}$ oe [B2 for $\frac{'5'}{24}$ where "5" is in the table or clearly identified as the number of boys who walk. (Accept final answer of 0 if accompanied by 0 in the table or indication that no boys walk)] [B1 for $\frac{a}{24}$, where $a \leq 13$ or 5 seen or 0 alone or $\frac{0}{24}$ given only as final answer.]

13	(a)	$1-0.3-0.1-x$	$0.6-x$	2	M1 for $0.3+0.1+x+P(2)=1$ oe A1 $0.6-x$ or $\frac{6}{10}-x$ or $1-(0.4+x)$ Or $1-0.3-0.1-x$
	(b)		$300x$	1	B1 for $300x, x\times 300$ oe

3	(a)		cross at ½	1	B1 at ½ with tolerance of ±2mm
	(b)		cross at 1	1	B1 at 1 with tolerance of ±2mm
	(c)		cross approx at ¼	1	B1 from cross between 1/8 and 3/8 from end.

12	(a)	1-(0.4+0.25+0.15) 1-0.8	0.2	2	M1 for 1 – "(0.4+0.25+0.15)" or 1 – 0.8 or sight of 0.92 A1 for 0.2 oe
	(b)	0.4 × 60	24	2	M1 for 0.4 × 60 A1 for 24 or "24 out of 60" SC B1 for $\frac{24}{60}$ or 24 in 60

5MB1F_01

Question		Working	Answer	Mark	Notes
5	(a)		unlikely	1	B1 cao
	(b)		impossible	1	B1 cao
	(c)		cross at 0	1	B1 for cross at 0 (tolerance 2mm)
	(d)		$\frac{2}{11}$	2	B2 for $\frac{2}{11}$ oe (B1 for $\frac{x}{11}$, $x < 11$, $x \neq 2$ or $\frac{2}{x}$, $x > 2$, $x \neq 11$) NB: ignore probabilities given in words.

12	(a)	0.10 + 0.25 + 0.30 or 1 − (0.15 + 0.20)	0.65	2	M1 for 0.10 + 0.25 + 0.30 or 1 − (0.15 + 0.20) A1 for 0.65 oe SC B1 for 0.85
	(b)	200 × 0.30	60	2	M1 for 200 × 0.30 A1 cao

5MB1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
13*		2329×0.9 =2096.1 2147×0.95 =2039.65 OR 4658×0.9 =4192.2 4294×0.95 =4079.3	Royal European	5	M1 for use of 2329 or 2147 (or sight of 4658 or 4294) ie selection of correct column M1 for attempting to calculate the discount for both their figures eg 2329×0.1 (=232.90) oe AND 2147×0.05 (=107.35) oe; 4658×0.1 (=465.8) oe AND 4294×0.05 (=214.7) oe) OR for attempting to find the discounted price for one eg 2329×0.9 (=2096.1) oe or 2147×0.95 (=2039.65) oe or 4658×0.9 (=4192.2) oe or 4294×0.95 (=4079.3) oe M1 for attempting to find the discounted price for both eg 2329×0.9 (=2096.1) oe AND 2147×0.95 (=2039.65) oe; 4658×0.9 (=4192.2) oe AND 4294×0.95 (=4079.3) oe A1 for 2096(.1) and 2039(.65) OR 4192(.2) and 4079(.3) figures rounded or truncated. C1 (dep on at least M1) for a statement deducing the cheapest company, but figures used for the comparison must also be stated somewhere, and a clear association with the name of each company.

5MB1F_01

10	(a)		A marked at 0	1	B1 for A marked at 0 (within overlay)
	(b)		B marked at 1/4	1	B1 for B marked at 1/4 (within overlay)

18	(i)		$\frac{7}{18}$	3	B1 for $\frac{7}{18}$ oe
	(ii)		$\frac{12}{18}$		B1 for $\frac{12}{18}$ **or** $\frac{2}{3}$ oe
	(iii)		0		B1 for 0 or $\frac{0}{18}$ or zero oe

3	(i) (ii) (iii)		Impossible $\frac{1}{2}$ $\frac{1}{6}$	3	B1 cao B1 for cross marked at $\frac{1}{2}$ B1 for $\frac{1}{6}$ oe

5MB1F_01

Question		Working	Answer	Mark	Notes
13	(a)	1 – (0.15 + 0.32 + 0.27) 1 – (15 + 32 + 27) $1 - (\frac{15}{100} + \frac{32}{100} + \frac{27}{100})$	0.26 26% $\frac{26}{100}$ (oe)	2	M1 for 1 – "(0.15 + 0.32 + 0.27)" oe or 26 seen A1 for 0.26 or $\frac{26}{100}$ (oe) or 26% (must include the % sign) [Note: 0.26 seen in the table and contradicted by an incorrect answer on the answer line gets M1A0]
	(b)	0.15 × 300	45	2	M1 for 0.15 × 300 (=45) oe A1 accept 45 out of 300

5MB1F_01

Question		Working	Answer	Mark	Notes
9	(a)		No + reason	1	B1 for no and the (prob.) of red is (bigger than the (prob.) of blue. OR (prob.) of blue is nearer 0 OR (prob.) of red is closer to 1 OR (prob.) of red is 50% and the (prob.) of blue is about 20% oe
	(b)(i)		$\frac{4}{7}$	2	B1 for $\frac{4}{7}$ oe
	(ii)		0		B1 for 0 or $\frac{0}{7}$ or 0% (accept 0 out of 7, but not 0:7 or 0 to 7)

22	(a)	1 – 0.7	0.3	2	M1 for 1 – 0.7 A1 for 0.3 oe
	(b)	200 ×0.7	140	2	M1 for 200 ×0.7 A1 for 140

6	(a) (b)		cross cross	1 1	B1 for cross placed less than 1 cm from 0 B1 for cross placed between 1 cm and 4 cm from 1
7*		Girls: 8 – 2 = 6 Boys: 6 – 1 = 5	correct with explanation	3	M1 for girls' range = 8 – 2 or boys' range = 6 – 1 or comparison of largest and smallest scores A1 for girls' range = 6 and boys' range = 5 C1 (dep on M1) ft for correct interpretation from candidate's working and where the two ranges have been correctly linked with girls and boys

14			$\frac{3}{12}$	2	B2 for $\frac{3}{12}$ or $\frac{1}{4}$ or 0.25, or 25% (B1 for $\frac{x}{12}$, $x < 12, x \neq 3$ or $\frac{3}{x}$, $x > 3$)

Question		Working	Answer	Mark	Notes
4	(a)		Cross at $\frac{1}{2}$	1	B1 for cross (×) within overlay
	(b)		Cross at 0	1	B1 for cross (×)within overlay
	(c)(i)		H1 H2 H3 H4 H5 H6 T1 T2 T3 T4 T5 T6		M1 for evidence of attempting combinations eg at least 5 correct A1 for all 12, no extras or repeats (Can repeat H1)
	(ii)		$\frac{3}{12}$	4	M1 ft for evidence of correct numerator or denominator In a fraction less than 1 A1 ft from (i) Note probability must written as a percentage, decimal or fraction

1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*5			20p	5	M1 for a method to find the price of the apples M1 for a method to find or use the price of 3 oranges ie 3×30 OR -30-30-30 M1 for a method to combine the costs of 'their fruit' **or** for a method to total the coins M1 (dep on at least M1 from the first M2 scored) for a method to find the difference between 'their total of the coins' and the price of both 'their fruits'. Could be 'total'-'total' or coins –'total' or coins – individual prices. It must be physically possible. C1 (dep on M1) for £0.20 or 20p and valid working OR M1 for a method to find the price of the apples M1 for a method to find or use the price of 3 oranges ie 3×30 OR -30-30-30 M1 for a method to select coins that equate to 'their total' for one fruit M1 (dep on at least M1 from the first M2 scored) for a method to select coins that equate to 'their total' for both fruits C1 (dep on M1) for £0.20 or 20p and valid working SC B1 £0.20 or 20p as the answer , no working shown

1MA0_1F

6			$\frac{1}{8}$	1	B1 for $\frac{1}{8}$ oe

7	(a)		$\frac{1}{2}$	1	B1 for mark at $\frac{1}{2}$ within overlay
	(b)		$\frac{1}{6}$	1	B1 for mark at $\frac{1}{6}$ within overlay
	(c)		1	1	B1 for mark at 1 within overlay

5MB1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*8			Comparison leading to £4.32	3	M1 for a method to work out the cost of 36 pencils M1 for a process that leads to a comparison C1 dep on a previous M1 for a clear statement/indication that Oliver spends £4.32 or that it is cheaper to buy the pencils singly with £4.32 seen NB Working can be in pounds or pence

Original question 26

The full source mark scheme begins on page 168. Use the original paper code, tier and question number shown above.

Question		Working	Answer	Mark	Notes
18	(a)(i)		$\frac{1}{6}$	2	B1 for $\frac{1}{6}$ or any equivalent fraction, percentage or decimal (rounded or truncated to 2 or more significant figures)
	(a)(ii)		0		B1 accept $\frac{0}{6}$, 0%, zero
	(b)		20	2	M1 for $\frac{1}{6} \times 120$ oe A1 cao (NB: An answer of $\frac{20}{120}$ scores M1 A0)

Question		Working	Answer	Mark	Notes
1	(a)		2	1	B1 cao
	(b)		8	1	B1 cao

13	(a)		$\frac{15}{100}$	5	M1 for fraction with 15 as the numerator or 100 as the denominator A1 for $\frac{15}{100}$ oe or 0.15 or 15%
	(b)		0	1	B1 oe Accept $\frac{0}{100}$, 0%, 0 out of 100 but not 0:100
	(c)		$\frac{1}{10}$		M1 for 100 – (50 + 25 + 15) A1 oe

PAPER: 5MB1F_01

PAPER: 1MA0_1F

Question		Working	Answer	Mark	Notes
6	(a)		Cross at $\frac{1}{4}$	1	B1 for cross in correct position
	(b)		Cross at $\frac{1}{2}$	1	B1 for cross in correct position
	(c)		Cross at 0	1	B1 for cross in correct position

16	(a)		Evens	1	B1 cao
			Certain	1	B1 cao
	(b)		4	2	M1 for 14 **or** $\frac{3+7}{n}=\frac{5}{7}$ **or** any fraction equivalent to $\frac{2}{7}$ or $\frac{5}{7}$ A1 cao

Original question 2

The full source mark scheme begins on page 188. Use the original paper code, tier and question number shown above.

Original question 7

The full source mark scheme begins on page 188. Use the original paper code, tier and question number shown above.

Original question 12

The full source mark scheme begins on page 188. Use the original paper code, tier and question number shown above.

2	(a)		red	1	B1 cao
	(b)		unlikely	1	B1 cao
	(c)		impossible	1	B1 cao

4	(a)		Cross at ½	1	B1 for mark at ½
	(b)		Cross at 0	1	B1 for mark at 0
	(c)		Cross at ¾	1	B1 for mark at ¾

Paper: 5MB1F_01

12	(a)		(17) 9 (14) 12 (13) 7 (29) 22 (21)	2	B2 for all 4 correct entries (B1 for 2 or 3 correct entries)
	(b)		$\frac{40}{72}$	1	$\frac{40}{72}$ B1 for $\frac{40}{72}$ oe
	(c)		$\frac{13}{32}$	1	$\frac{13}{32}$ B1 for $\frac{13}{32}$ oe

Paper_5MB1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*13			4	4	M1 for 200 ÷ (1 + 9) (= 20) M1 for 750 ÷ 20 (= 37.5) A1 for 3.7(3….) or $3\frac{11}{15}$ or 2800 **and** 3000 C1 ft (dep on M1) for clear statement of 4 bottles with working shown **OR** M1 for 750 × 10 (= 7500) M1 for 200 × 140 (= 28 000) A1 for 3.7(3….) or $3\frac{11}{15}$ or 2800 **and** 3000 C1 ft (dep on M1) for clear statement of 4 bottles with working shown **OR** M1 for 200 × 140 (= 28 000) M1 for 28 000 ÷ (9 + 1) (= 2800) A1 for 3.7(3….) or $3\frac{11}{15}$ or 2800 **and** 3000 C1 ft (dep on M1) for clear statement of 4 bottles with working shown **OR** M1 for 200 ÷ (1 + 9) (= 20) M1 for 140 × "20" (= 2800) A1 for 3.7(3….) or $3\frac{11}{15}$ or 2800 **and** 3000 C1 ft (dep on M1) for clear statement of 4 bottles with working shown

Paper 5MB1F_01

15			$\frac{20-x}{20}$	2	M1 for writing $20 - x$ OR 20 as any denominator below an algebraic expression in x or $20 - x \div 20$ A1 for $\frac{20-x}{20}$ or $1 - \frac{x}{20}$ oe

7		Probability scales lengthened	

Question		Modification	Notes
12		Braille: (i) is put in total women and (ii) in train total	

Original question 13

The full source mark scheme begins on page 200. Use the original paper code, tier and question number shown above.

Original question 10

The full source mark scheme begins on page 213. Use the original paper code, tier and question number shown above.

5	(a)		winter	1	B1 cao
	(b)		amaryllis	1	B1 cao
	(c)(i)		Mark at 0	2	B1 for mark at 0
	(ii)		Mark at $\frac{1}{2}$		B1 for mark at $\frac{1}{2}$

17	(a)		**14** 13 **20** 47 **12** **7** 34 **53** 26 20 **54** 100	3	B3 for fully correct table (B2 for 3 or 4 or 5 correct entries) (B1 for 1 or 2 correct entries)
	(b)		$\frac{13}{47}$	2	M1 for $\frac{13}{n}$, $n > 13$ or for $\frac{n}{47}$, $n < 47$ A1 for $\frac{13}{47}$ (or 0.27 - 0.28 or 27% - 28%)

8	(a)(i)		likely	2	B1 cao
	(ii)		Mark at 0		B1 cao
	(b)		Mark at $\frac{1}{2}$	1	B1 cao
	(c)	(1, H), (2, H), (3, H), (4, H), (5, H); (6, H), (1, T), (2, T), (3, T), (4, T), (5, T), (6, T)	combinations shown	2	M1 for at least 4 correct outcomes A1 for all 12 correct outcomes with no incorrect outcomes and no repeats

PAPER: 1MA0_1F

10	(a)		$\frac{68}{105}$	1	B1 oe
	(b)		22	2	M1 for 105 – 15 – 68 oe A1 cao
	(c)		14.3	2	M1 15 ÷ 105 × 100 oe A1 for answer in range14.2 – 14.3

PAPER: 1MA0_2F

Question		Working	Answer	Mark	Notes
22	(a)		$\frac{1}{30}$	1	B1 oe
	(b)		$\frac{3}{10}$	2	M1 for method to sum number of white chocolates, eg 4 + 4 + 1 (= 9) A1 $\frac{3}{10}$ or $\frac{9}{30}$ oe
	(c)		0.48	2	M1 for 1 – (0.35 + 0.17) oe A1 0.48 oe
*23		1155 ÷ 15 = 77 $x + 2x + x - 7 = 77$ $4x - 7 = 77$ $4x = 84$ $x = 21$ OR $15x + (15 \times 2x) + 15(x - 7) = 1155$ $60x - 105 = 1155$ $60x = 1260$ $x = 21$	Redlands 21 St Samuels 42 Francis Long 14	5	M1 for $2x$ or $x-7$ M1 for 1155 ÷ 15 (= 77) M1 (dep M2) for equation summing their three expressions to '77' A1 for 21,42 and 14 C1 for fully correct answer with correct labels OR M1 an expression for the cost of the pupils from Redlands M1 for expression for the cost of the pupils from either St Samuels or Francis Long M1 (dep M2) for equation summing their three expressions to 1155 A1 for 21,42 and 14 C1 for fully correct answer with correct labels

3	(a)		× at 0.5	1	B1 cao
	(b)		× at 0	1	B1 cao
	(c)		Unlikely	1	B1 cao

Question	Working	Answer	Mark	Notes
10 (a)		$\frac{9}{20}$	2	M1 for $\frac{n}{9+11}$ where $1 \leq n < 20$ **or** $\frac{9}{m}$ where $9 < m < 20$ A1 $\frac{9}{20}$ oe
(b)		3	3	M1 $\frac{2}{5} \times (10+20)$ (=12) M1 "12" - 9 A1 cao or M1 $\frac{2}{5} = \frac{2 \times "6"}{10+20} \left(= \frac{12}{30}\right)$ M1 '12' - 9 A1cao

13	(a)		1 - x	1	B1 cao
	(b)		200(1 - x)	2	M1 for 200 × "(1 – x)" A1 ft e.g. 200(1 - x) or 200 - 200x

5	(a)(i)		unlikely	3	B1 cao
	(ii)		impossible		B1 cao
	(iii)		evens		B1 cao
	(b)		J K L L L L M M	2	M1 for number of Js = number of Ks OR number of Ls = twice number of Ms A1 cao

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21	(a)		2:3	1	B1 cao
	(b)		$\frac{3}{5}$	2	M1 ft for adding the numbers in their ratio to get an acceptable total AND using this as their denominator eg 4 + 6 = 10 or 2 + 3 = 5 A1ft $\frac{3}{5}$ oe

PAPER: 1MA0_2F

Original question 3

The full source mark scheme begins on page 229. Use the original paper code, tier and question number shown above.

Original question 7

The full source mark scheme begins on page 229. Use the original paper code, tier and question number shown above.

Original question 21

The full source mark scheme begins on page 243. Use the original paper code, tier and question number shown above.

12	(a)		$\frac{1}{6}$	1	B1 for $\frac{1}{6}$ oe
	(b)		1	1	B1 cao

PAPER: 1MA0_2F

Original question 16

The full source mark scheme begins on page 262. Use the original paper code, tier and question number shown above.

PAPER: 5MB1F/01

Question		Working	Answer	Mark	Notes
1	(a)		Evens	1	B1 cao
	(b)		Impossible	1	B1 cao
	(c)		X marked	1	B1 for X marked at $\frac{1}{4}$

3			1 lemon 3 orange	2	B2 for 1 lemon and 3 orange labelled (B1 for labels for P(Orange) > P(Lemon))

17			1746	3	M1 for 1 – 0.03 (= 0.97) or for 0.03 × 1800 (= 54) M1 for "0.97" × 1800 or for 1800 − "54" A1 cao
*18			School £8930 Hospital £13 395	5	M1 for 23.5 × 1000 (= 23 500) or for $\frac{1}{20}$ × 1000 (= 50) oe M1 for "23 500" × $\frac{19}{20}$ (= 22 325) oe or for (1000 – 50) × 23.50 (= 22 325) oe M1 for "22 325" ÷ 5 (= 4465) M1 for "4465" × 2 or "4465" × 3 C1 for £8930 for school and £13 395 for hospital

Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5°
Measurements of length: ±5 mm

PAPER: 5MB1F_01			
Question		**Modification**	**Notes**
Q1		Diagram enlarged. Wording added 'It shows a probability scale'. Diagram enlarged. Wording removed 'with a cross (x)'.	Standard mark
Q2		Wording added 'It shows a pictogram'. Diagram enlarged.	Standard mark

PAPER: 5MB1F_01			
Question		**Modification**	**Notes**
Q3		Diagram removed. Wording changed 'There are 6 sweets in a bag. The flavour of each sweet is either orange or lemon. The flavour of two of the sweets is shown below.' Wording added 'Orange' and 'Lemon'. Jane is going to take at random one on the sweets from the bag. She is twice as likely to take an orange sweet as a lemon sweet. Write a suitable flavour for the remaining sweets. Wording added 'The first two are repeated for you' and 'There are four spaces to fill'. Wording added 'Orange' and Lemon' put below the question with four short answer lines underneath.	Standard mark
Q 4		2155 column removed from table.	Standard mark
Q5		Table turned to vertical format. Wording added 'It shows a grid'. Grid enlarged: 12 squares across and 21 squares up.	Standard mark
Q6	(a)	Wording added 'It shows a frequency table'. Wording added 'using the information in the diagram book' after 'frequency table'. Wording added 'there are eight spaces to fill' below 'Complete the…'	Standard mark
Q8		Box removed.	Standard mark

PAPER: 5MB1F_01			
Question		**Modification**	**Notes**
Q9		'Number of different stitches' column removed from table.	Standard mark
Q10		Grid enlarged. Diamonds changed to solid circles.	Standard mark
Q11		Base line added to stem and leaf diagram.	Standard mark
Q12		Diagram enlarged.	Standard mark
Q13		Information stacked in vertical format and put into tables.	Standard mark
Q14		Wording added 'It shows a scatter graph'. Diagram enlarged. Crosses changed to solid circles.	Standard mark
Q15		Wording added 'There are six spaces to fill'. **Braille only**: roman numerals (i) to (vi) put in spaces on the table. 8 (i) 25 44 (v) 17 (ii) (iii) (vi) (iv) 32 80	Standard mark

Question	Working	Answer	Mark	Notes
9 (a)		13347	1	B1 cao
(b)		73314	2	B2 cao (B1 for 74331 **or** any number made from the given 5 digits ending with 4)
(c)		$\frac{1}{5}$	1	B1 for $\frac{1}{5}$ oe
(d)		$\frac{4}{5}$	1	B1 ft for $\frac{4}{5}$ oe
*10		1.2 m or 120 cm	4	B1 for evidence of using 1 m = 100 cm M1 for subtracting the four post widths from the total length eg $4 - 4 \times 10$ (= 360) or "400" $- 4 \times 10$ or $3x + 40 = 400$ (oe) M1 for dividing their total space found by 3 or subtracting 40 from both sides of $3x + 40 = 400$ C1 for correct conclusion for 1.2 m or 120 cm with supported working

20	(A, 1), (A, 2), (A, 3) (B, 1), (B, 2), (B, 3) (C, 1), (C, 2), (C, 3)	$\frac{1}{9}$	3	M1 for any 3 combinations with no incorrect combinations or for 3 × 3 A1 for all 9 combinations with no duplicates or extras **or** for 9 B1 (dep on M1) for $\frac{1}{'9'}$ **Alternative scheme** B1 for $\frac{1}{3}$ seen M1 for $\frac{1}{3} \times \frac{1}{3}$ A1 for $\frac{1}{9}$ oe

23	(a)		0.3	2	M1 for $1 - (0.25 + 0.10 + 0.20 + 0.15)$ oe A1 oe
	(b)		6	2	M1 for 60×0.10 oe A1 cao

PAPER: 1MA0/2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
*24		large carton with correct calculations	3	M1 for 1.60 ÷ 125 (= 0.0128) or 2.8 ÷ 225 (= 0.0124(4…) or 125 ÷ 1.60 (= 78(.125(g)) or 225 ÷ 2.80 (= 80(.35…g)) or any other calculation that could lead to a comparative figure M1 for 1.60 ÷ 125 (= 0.0128) **and** 2.8 ÷ 225 (= 0.0124(4…) or for 125 ÷ 1.60 (= 78(.125(g)) **and** 225 ÷ 2.80 (= 80(.35…g)) or for calculations that could lead to comparative figures for the 2 cartons C1 for correct comparative figures for both cartons leading to a correctly stated comparison. Accept any other method considered equivalent. Figures may be truncated or rounded as long as their method is clear.

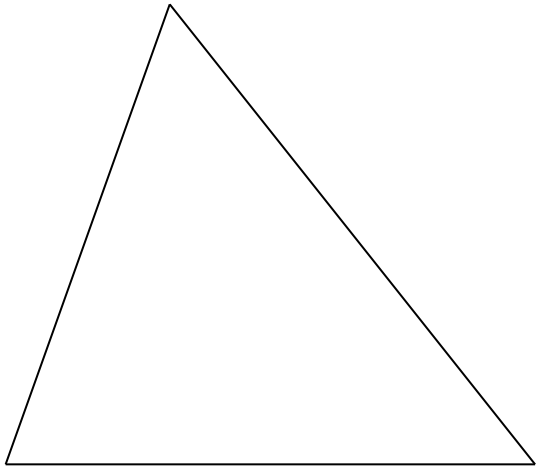
4	(ai)		evens	2	B1 for evens circled oe
	(aii)		unlikely		B1 for unlikely circled oe
	(b)		cross at 0	1	B1 for 0 marked with a cross

8	(a)	<table><tr><td>(4, 4)</td><td>(4, 5)</td><td>(4, 6)</td></tr><tr><td>(5, 4)</td><td>(5, 5)</td><td>(5, 6)</td></tr><tr><td>(6, 4)</td><td>(6, 5)</td><td>(6, 6)</td></tr></table>	Complete diagram	1	B1 cao
	(b)		$\frac{1}{36}$	1	B1 for $\frac{1}{36}$
	*(c)		7 has greater probability with correct reason	1	C1 for 7 has greater probability oe with correct reason, eg gets a total of 7 more often

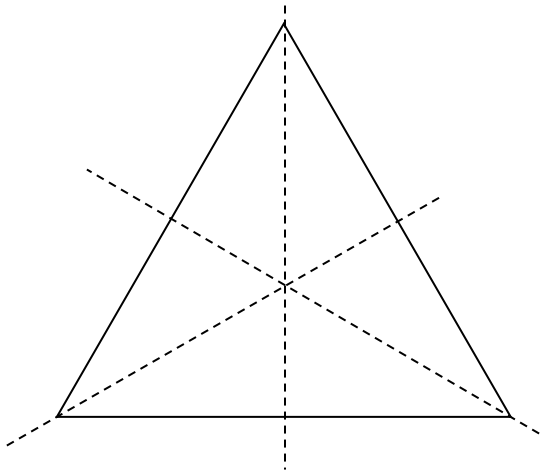
PAPER: 5MB1F_01

Question	Working	Answer	Mark	Notes
24		$\frac{4}{15}$	3	M1 for a method to find the total number of people e.g 3×5 (= 15) or writing $\frac{5}{15}$ as an equivalent fraction to $\frac{1}{3}$ M1 (dep) for "15" – 5 – 6 (= 4) A1 oe **or** M1 for a method to find prob (boy) e.g. $\frac{6}{5} \times \frac{1}{3} (= \frac{6}{15})$ M1 (dep) for $1 - "\frac{6}{15}" - \frac{1}{3}$ A1 oe **or** M1 for an expression for the probability of the number of girls in the room e.g. $\frac{5}{5+6+x}$ M1 (dep) for "$\frac{5}{5+6+x}$" = $\frac{1}{3}$ or $x = 4$ A1 oe **SC B2 for** $\frac{4}{n}$ where $n > 4$ and $\neq 15$

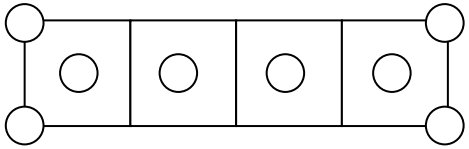
6c



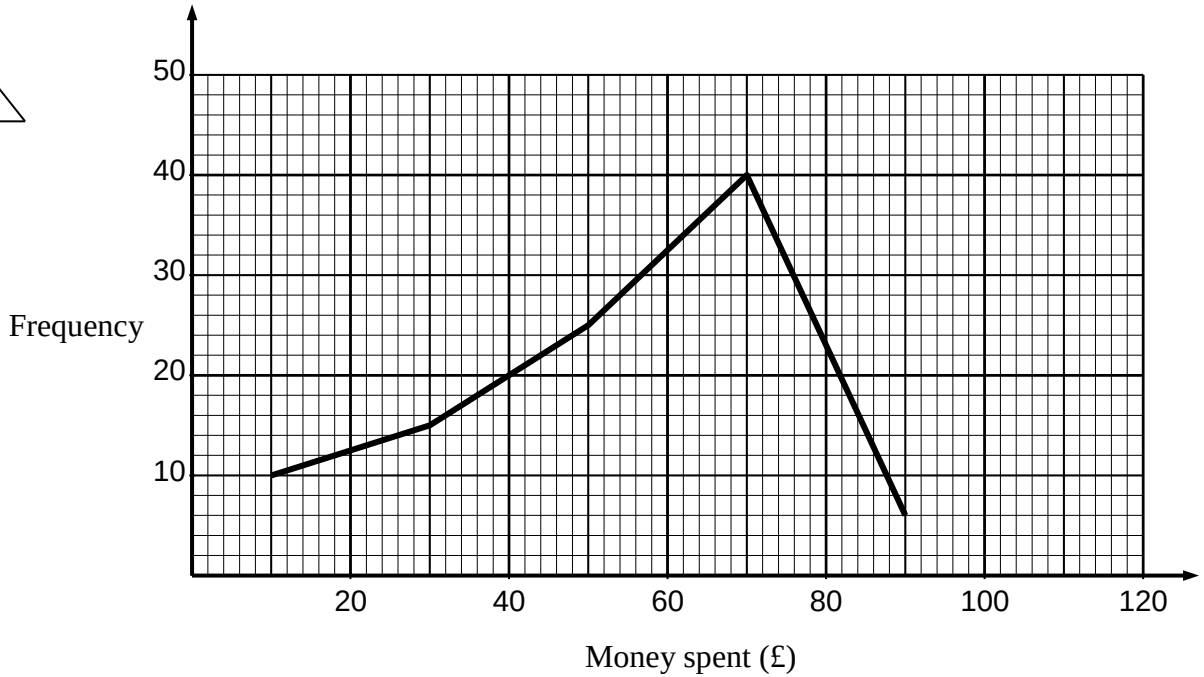
12a



5a



20a



Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5º
Measurements of length: ±5 mm

PAPER: 1MA0_1F			
Question		**Modification**	**Mark scheme notes**
1		Diagram enlarged. Key moved above and to the left of the diagram.	Standard mark scheme
3		Diagram enlarged. Wording 'centimetre' removed. Shapes labelled 'shape A, shape B, shape C, shape D, shape E and shape F.' Layout of shapes changed so shapes A B C are on the top row then D E F are below. Shading changed to dotty shading. In (c) Wording added 'Each square on the grid represents a one centimetre square.'	Standard mark scheme
5		The 3 patterns are stacked vertically. Pattern number 3 is repeated below pattern number 3 and is labelled 'pattern number 4.' Wording changed to 'There is a sequence of patterns made from lines and circles: pattern number 1, pattern number 2 and pattern number 3.' In (a) Wording changed to 'Pattern number 4 has been started below pattern number 3. Complete pattern number 4 on the diagram.' Diagram removed. In (b) Table has been turned to vertical format. Wording added 'There are two spaces to fill.'	Standard mark scheme
6	(a)	Diagram enlarged. Angle sizes moved outside of the angle arcs and the arcs have been made smaller.	Standard mark scheme
6	(b)	Diagram enlarged. 7 cm changed to 9 cm and 6.5 cm changed to 8.5 cm. Angle size moved outside of the arc and the arc has been made smaller.	Standard mark scheme
6	(c)	Line *PQ* made 9 cm.	Standard mark scheme adjusted for the fact that *PR* has now changed from 6.5 cm to 8.5 cm.
9		Diagram enlarged. Right axis has been labelled. Axes labels have been moved to the left of the horizontal axis and above the vertical axis. In (a) 36 changed to 35.	In (a) award the mark for an answer in the range 7.6 to 7.9 gallons. In (b) use the standard mark scheme.

4	(a)		Mark at $\frac{1}{2}$	1	B1 for mark at $\frac{1}{2}$
	(b)		Mark at 1	1	B1 for mark at 1
	(c)		Mark at $\frac{1}{4}$	1	B1 for mark at $\frac{1}{4}$

Paper: 1MA0/2F

6	(i)		× at ½	B1	
	(ii)		× at 0	B1	

12		$\frac{7}{17}$	M1 A1	for $\frac{a}{17}$ where a ≠7 but < 17 or $\frac{7}{b}$ where b≠17 but > 7 oe

7		0.985	B1	oe

Original question 17

The full source mark scheme begins on page 284. Use the original paper code, tier and question number shown above.

17	(a)		12	B1	cao
	(b)		Explanation	C1	No with statement about not being mutually exclusive events eg a person could be in both categories

Paper: 1MA1/3F

12	(a)	**12** 7 19 18 **8** 26 **30** 15 **45**	Correct table	B3 (B2 (B1	Fully correct table for 5, 6, 7 or 8 figures correct) for given values entered correctly in the table **or** for a correct row **or** column)
	(b)		$\frac{8}{45}$	B1	for $\frac{8}{45}$ **or** ft from values in table eg $\frac{"8"}{"45"}$

Paper 1MA1: 1F

12 (a)		23, 177 10, 13, 85, 92	C3 (C2 (C1	Completes all information correctly. 3 or 4 correct frequencies or all correct probabilities) 2 correct frequencies)
(b)		$\frac{13}{23}$	M1 A1	ft oe for $\frac{a}{23}$, $a < 23$ or $\frac{13}{b}$, $b > 13$ ft oe from (a)

Paper: 1MA1/2F

19		$\frac{1}{11}$	P1 P1 A1	for starting the process, eg by writing down a correct ratio or using a given number of cubes for one relationship, eg 2B 1Y or B:Y = 2:1 or 4G 1B or G:B = 4:1 or 8G, 1Y or G:Y = 8:1 oe or yellow = 2, blue = 4, or states 2:1:8 oe in any order (can be algebraic) for complete process to find possible number of each colour or equivalent ratio, eg 8G 2B 1Y or G:B:Y = 8:2:1 oe or yellow = 2, blue = 4, green = 16 oe (can be algebraic) $\frac{1}{11}$ oe

26	(a)		Mel (supported)	B1	Mel with reference to greatest number of throws
	(b)		$\frac{2}{9}$	M1	selects overall total and multiplies P(point up)×P(point down) eg $\frac{50}{150}\times\frac{100}{150}$ oe (accept $\frac{14}{45}\times\frac{31}{45}$ or $\frac{27}{80}\times\frac{53}{80}$ or $\frac{9}{25}\times\frac{16}{25}$)
				A1	for $\frac{2}{9}$ oe

Paper: 1MA1/3F

Question	Answer	Mark	Mark scheme	Additional guidance
7 (a)	D	B1	cao	
(b)	B	B1	cao	
(c)	Shown	M1	for number of green counters, eg $12 - (3+1+2) = 6$ **OR** for $\frac{3}{12}$ oe **or** $\frac{1}{12}$ oe **or** $\frac{2}{12}$ oe linked to the appropriate colour	This is awarded for a correct first step
		M1	for $1 - (\text{"}\frac{3}{12}\text{"} + \text{"}\frac{1}{12}\text{"})$ $(= \frac{8}{12})$ or "$\frac{2}{12}$"+ $\frac{\text{"6"}}{12}$ $(= \frac{8}{12})$ **OR** for method to find $\frac{2}{3}$ of 12, eg. $12 \div 3 \times 2$ (= 8)	This is awarded for a fully correct method from which the correct answer of $\frac{2}{3}$ can be found Sight of $\frac{8}{12}$ gets M2
		C1	for correct conclusion supported by accurate figures, eg $\frac{8}{12} = \frac{2}{3}$ **or** $\frac{2}{3}$ of 12 = 8 **and** number of yellow + green = 2 + 6 = 8	

Question		Answer	Mark	Mark scheme	Additional guidance
13		$\frac{338}{350}$	M1	for 350 – 12 (=338) **or** $\frac{y}{350}$ oe where $y < 350$ **and** $y \neq 12$ **or** $1-\frac{12}{350}$ oe	For the method mark probability fractions can be expressed as equivalent expressions, even if not correct probability notation eg. 338 : 350 scores M1 A0
			A1	oe	Using correct probability notation Allow 0.96 to 0.97 or 96% to 97%

14	(a)	6 | 4799 7 | 0015667 8 | 0011247 9 | 14	B2 (B1 B1	for correct ordered stem and leaf for fully correct unordered or ordered with one error or omission) (indep) for key (units not required but must be correct if stated) eg 6 | 4 = 64 (marks)	
	(b)	Explanation	C1 C1	for identifying "6" students failed (ft their diagram) **OR** for 20 ÷ 4 (= 5) for comparing $\frac{1}{4}$ with $\frac{6}{20}$ or $\frac{3}{10}$ (ft their diagram) **OR** for comparing "6" with 5	Explanation does not need to state that Omar is wrong, but just needs to provide two comparable values (that are not the same) unless ft values show that Omar is not wrong in which case a statement is needed.

Question	Answer	Mark	Mark scheme	Additional guidance
24 (a)	8	P1	for process to find sum of unknown probabilities, eg $1 - 0.45 - 0.25$ (= 0.3) **OR** to find the total number of counters in the bag, eg $\frac{18}{0.45}$ (= 40) **OR** to find the number of yellow counters, eg $\frac{0.25}{0.45} \times 18$ (= 10)	Award mark for any two probabilities given that sum to 0.3 eg given in the table.
		P1	for process to find P(red) = 0.2 oe **or** P(white) = 0.1 oe **OR** for process to find the total number of red and white counters, eg "40" – 18 – "10" (=12) **OR** for process to derive an equation in x, eg $2x + x = 1 - 0.45 - 0.25$ or $2x + x =$ "0.3" or $x = 0.1$	Award P2 for P(red) or P(white) (could be shown in table) Equations could be given as written statements or working but must be fully equivalent.
		P1	for a complete process to find the number of red counters, eg $\frac{2 \times 0.1}{0.45} \times 18$ or $\frac{2}{3} \times$ "12" or $0.2 \times$ "40" or $\frac{0.2}{0.025}$	
		A1	cao	
(b)	Explanation	C1	for explanation eg 0.5 multiplied by an odd number will never be a whole number, for half of a number to be an integer that number must be even, you can't have half a marble	

Paper: 1MA1/3F

17 (a)	32, 48, 24, 8, 37, 11	C1	starts to interpret information, eg 48 or 8 in correct place	
		C1	for 80 – 48 (= 32) and “32” – 8 (= 24)	
		C1	completes frequency tree correctly SC: award C2 if all correct frequencies are shown as fractions of 80.	
(b)	$\frac{37}{61}$	M1	ft for $\frac{a}{\text{"61"}}$ with $a <$ “61” or $\frac{\text{"37"}}{b}$ with $b >$ “37”	Incorrect notation with “37” and “61”can earn the method mark but not the accuracy mark.
		A1	ft from diagram in (a)	Accept any equivalent fraction, decimal form 0.60(65...) or 0.61 or percentage form 60(.65...)% or 60% or 61%

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
12	$\frac{29}{49}$	P1	for $\frac{29}{a}$ where $a > 29$ **or** $\frac{b}{49}$ where $b < 49$ **or** $1 - \frac{20}{49}$ **or** $\frac{49-20}{c}$ where $c > 49 - 20$ **OR** for 29 and 49 with incorrect notation eg 29 : 49	
		A1	oe	Acceptable equivalents are any equivalent fraction to $\frac{29}{49}$, decimal 0.59 (…) or 59 (…)%

Question	Answer	Mark	Mark scheme	Additional guidance
14 (a)	No (supported)	C1	No and explanation eg "it is $\frac{1}{6}$" or "each number is the same probability" **Acceptable examples** No, they are both 1/6 (accept 1 in 6 or 1 : 6 etc) No, they are both the same No, an equal chance No, it's a fair dice No, there's only one of each number **Not acceptable examples** No, it's an even chance No, it's 50 – 50 No, 1 : 6	
(b)	No (supported)	C1	No and explanation eg "it is out of 36" or "it is $\frac{1}{6}$ times $\frac{1}{6}$" **Acceptable examples** No, the probability is 1/36 No, it's out of 36 No, he should times not add **Not acceptable examples** No, it's 1/6 × 1/6, the probability is 1/12 No, he's more likely to get it once only No, there's only one 6 on a dice No, you will have a 2/12 chance	
(c)	1H, 2H, 3H, 4H, 5H, 6H, 1T, 2T, 3T, 4T, 5T, 6T	B2 (B1	for all 12 outcomes with no extras or repeats for at least 6 correct outcomes, ignoring extras and repeats)	Pairs must be unambiguous Accept words and abbreviations

Paper: 1MA1/2F

6	(a)	Cross at $\frac{1}{2}$	B1	cross at $\frac{1}{2}$	Accept any other marks near to ½ if the intention is clear; do not accept if any other marks are shown.
	(b)	$\frac{2}{6}$	B1	$\frac{2}{6}$ oe	Acceptable equivalents are equivalent fractions to $\frac{2}{6}$ eg $\frac{1}{3}$ decimal 0.33(…) or 33(..)%

14	(a)	0.3	B1	for 0.3 oe	Acceptable equivalents are 3/10 or 30% Answer on answer line takes precedence
	(b)	4	B1	4 or ft their (a)	Do not accept a statement of probability (eg 0.1)
	(c)	12	M1	for 0.2 × 60 oe	Do not accept the use of any other probability
			A1	cao	

Paper: 1MA1/3F

17	(i)	Maxine with bigger number of trials	C1	for Maxine with reason **Acceptable examples** She throws the coin more times than Stuart **Not acceptable examples** Maxine throws it 50 times She gets more Tails Stuart (he) ……	
	(ii)	$\frac{37}{60}$	B1	for $\frac{37}{60}$ oe	

Paper: 1MA1/1F

22	(a)	0.4, 0.4	P1	for process to find sum of unknown probabilities, eg 1 – 0.2 (= 0.8)	Award mark for any two probabilities given that sum to 0.8, eg given in the table
			A1	oe	Accept any equivalent fraction or 40%
	(b)	60	P1	for complete process to find total number of cubes, eg 12 ÷ 0.2 **or** 12 × 5 **or** (“0.4” ÷ 0.2) ×12 + (“0.4” ÷ 0.2) ×12 + 12 **OR** states 0.1 = 6 **or** 0.4 = 24	
			A1	cao	

Paper: 1MA1/1F

Paper: 1MA1/2F

Question	Answer	Mark	Mark scheme	Additional guidance
16 (a)(i)	B	B1	for B, accept 0.033 on the answer line	
(ii)	C	B1	for C, accept $\frac{1}{3}$ on the answer line	
(b)	Statement	C1	eg No with $\left(\frac{1}{3}\right)$ and $\frac{2}{3}$ or No, probabilities would need to be $\frac{1}{2}$ or No since $\frac{1}{3} + \frac{1}{3}$ does not equal 1 or No since tails is 67% (or 0.67)	Accept rounded conversions **seen** to decimals or percentages if the reasoning is correct
(c)	132	M1	for 4000×0.033 **OR** $\frac{132}{4000}$	
		A1	cao	132 out of 4000 is an acceptable answer

Paper: 1MA1/2F

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
15 (a)	16 45 29 75 14 61	C1	starts to interpret information eg 75 or 29 in the correct place	May be seen as numerators of fractions for the first 2 marks.
		C1	for 120 – 75 (= 45) and "45" – 29 (= 16)	Could be seen in working or on the diagram
		C1	Complete and correct frequency tree	
(b)	$\frac{29}{120}$	B1	for $\frac{29}{120}$ or ft "29" from part (a)	Accept any equivalent fraction, decimal form 0.24(166…) or percentage form 24(.166..) Ignore subsequent incorrect attempts to write the correct answer in a different form.

Question	Answer	Mark	Mark scheme	Additional guidance
9 (a)	5	M1	for listing numbers in order, eg 3 4 4 6 8 9 **or** answer of 4, 6 **or** answer of 8.5	Condone one error or additional number
		A1	cao	
(b)	$\frac{2}{6}$	M1	for $\frac{2}{x}$ with $x > 2$ **or** for $\frac{y}{6}$ with $y < 6$	Incorrect notation can imply a correct method. Award M1 for eg 2 out of 6 **or** 2 in 6 **or** 2 : 6
		A1	for $\frac{2}{6}$ oe	Accept any equivalent fraction, decimal form 0.33(33..) or percentage form 33(.33..)%
(c)	3, 6	P1	for at least one 3 **or** 5×5 (= 25)	Numbers may be seen on the cards (but the answer line takes precedence)
		A1	for 3, 6 or 6, 3	

Paper: 1MA1/3F

Question	Answer	Mark	Mark scheme	Additional guidance
16	blue 0.15 green 0.2	P1	for 1 – 0.4 – 0.25 (=0.35) oe	May work in percentages, condone missing % sign If the two numbers in the table sum to 0.35 that implies P1
		P1	for using the ratio, eg "0.35" ÷ (3 + 4) (=0.05) **or** "0.35" × $\frac{3}{7}$ (=0.15) **or** "0.35" × $\frac{4}{7}$ (=0.2)	One correct value in the table implies P2 7 can come from 3+4
		P1	for a complete process 3 × "0.05" (=0.15) **and** 4 × "0.05" (=0.2) **or** "0.35" – "0.15" (=0.2) **or** "0.35" – "0.2" (=0.15) **or** green 0.15, blue 0.2	
		A1	oe	Accept answers given in decimals, fractions or percentages.

6	(a)	cross at ½	B1	Cross (or mark) at ½	Accept any mark near to ½ if the intention is clear; do not accept if any additional marks are shown
	(b)	cross at 0	B1	Cross (or mark) at 0	Accept any mark near to 0 if the intention is clear; do not accept if any additional marks are shown

Paper: 1MA1/1F

Paper: 1MA1/3F

Question	Answer	Mark	Mark scheme	Additional guidance
16 (a)	$\frac{5}{11}$	M1	for $\frac{5}{n}$ where $n > 5$ or $\frac{m}{"11"}$ where $m < 11$	where "11" comes from 5+2+4
		A1	for $\frac{5}{11}$ oe	Accept any equivalent fraction, decimal form 0.45(45...) or percentage form 45(.45...)%
(b)	0.7	B1	for 0.7 oe	Accept any equivalent fraction eg $\frac{7}{10}$ or percentage form eg 70%

Question	Answer	Mark	Mark scheme	Additional guidance
16 (a)	120	M1	for sensible use of proportion eg $\frac{135}{90}$ (= 1.5) **or** $\frac{90}{135}$ (= $\frac{2}{3}$) **or** 135 × 4 (= 540) **or** 135 ÷ 9 (=15) **or** 80 ÷ 90 (= 0.888...)	ie 135 ÷ 9 but not 135 ÷ 10 without 80 ÷ 9
		M1	for a complete method eg 80 × "1.5" **or** 80 ÷ "$\frac{2}{3}$" **or** "540" × $\frac{80}{360}$ **or** "15" × 8 **or** "0.888..." × 135	
		A1	cao	
(b)	$\frac{50}{540}$	M1	for method to find total number of cars, eg 135 × $\frac{360}{90}$ (= 540) **or** for $\frac{50}{135} \times \frac{1}{4}$ oe **or** begins to work with probability by using a numerator of 50 eg $\frac{50}{a}$ where a >50 and an integer	
		A1	for $\frac{50}{540}$ oe ft "540" from part (a)	Accept any equivalent fraction, decimal form 0.09(25..) or percentage form 9(.25..)%

Paper: 1MA1/2F

26	(a)	0.5, 0.3	P1	for $1 - 0.05 - 0.15$ (=0.8)	Award this mark for any two probabilities that sum to 0.8
			A1	oe	
	(b)	120	M1	$18 \div 0.15$ oe **or** $6 + 18 + a + b$ where $a + b = 96$	
			A1	cao	

13	(a)	$\frac{4}{15}$	B1	oe	4 : 15 gets B0
	(b)	0.7	B1	for 0.7 oe or $\frac{7}{10}$ oe or 70%	

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
17 (a)	Frequency diagram See end of m/s	C3 (C2 (C1	for a fully correct frequency diagram for at least 5 correct values in the frequency diagram) for at least 3 correct values in the frequency diagram)	If probabilities used instead of frequencies then maximum of C2 can be awarded
(b)	$\frac{12}{72}$	M1	for $\frac{a}{72}$ where $0 < a < 72$ and a is an integer **or** $\frac{12}{b}$ where $b > 12$ and b is an integer **or** 12 : 72 **or** ft their values for 72 and/or 12 from (a)	
		A1	for $\frac{12}{72}$ oe or ft (a)	Accept equivalent decimal or percentage forms of probability Ignore errors in cancelling of their $\frac{12}{72}$

10	(a)	cross at 0	B1	cao	
	(b)	cross at $\frac{1}{2}$	B1	cao	
	(c)	$\frac{5}{8}$	M1	for $\frac{"5"}{a}$ where $a >$ "5" or $\frac{b}{8}$ where $b < 8$ **or** for identifying all the even numbers, 2, 6 and 8 **or** for writing the correct probability using the wrong notation eg 5 : 8	To ft "5" the "5" needs to be clearly stated as being the number of even numbers; otherwise accept 5 only; could be indicated alongside the given numbers.
			A1	for $\frac{5}{8}$ oe	Could be written as a decimal (0.62, 0.625 or 0.63) or equivalent percentages to these

Paper: 1MA1/3F

Question	Answer	Mark	Mark scheme	Additional guidance
7 (a)	A	B1	cao	
(b)(i)	Cross at correct position	B1	for cross at $\frac{1}{4}$	Cross or other indication may be seen on or near line provided within tolerance
(b)(ii)	$\frac{1}{8}$	B1	for $\frac{1}{8}$ oe	Accept any equivalent fraction, decimal form 0.125 or percentage form 12.5% Do **not** accept 1 : 8 or 1 to 8 or 1 out of 8

Question	Answer	Mark	Mark scheme	Additional guidance
17 (a)	$\frac{70}{100}$	M1	for 100 – 30 (= 70) or $\frac{30}{100}$ oe	
		A1	for $\frac{70}{100}$ oe	Accept any equivalent fraction, decimal form 0.7 or percentage form 70%
(b)	45	P1	for start to process, eg 30 ÷ 2 (= 15)	
		A1	cao	
(c)	No with reason	C1	for No with reason **or** ft (b) **Acceptable examples** the number of red and yellow counters is an odd number 25 cannot be divided by 2 to give a whole number You can't have half a counter You can't split it evenly **Not acceptable examples** Yes ….. they are in the ratio 2 : 3 one must be more than the other	If the reason is supported by numerical evidence then that evidence must be accurate. can ft (b) Note: if the answer to part (b) is an even number then 'yes' with supporting evidence is an acceptable answer

Paper: 1MA1/1F

23	7500	M1 A1	for method to find expected number of model B, eg $\frac{15}{80} \times 40000$ oe **or** $\frac{15}{"23+15+30+12"} \times 40000$ oe cao	

Paper: 1MA1/1F

6	(a)	Cross marked at 0	B1		Allow if intention is clear
	(b)	Cross marked at $\frac{1}{2}$	B1		Allow if intention is clear

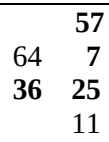
Question	Answer	Mark	Mark scheme	Additional guidance
15	Spinner (supported)	P1	for a process to express one relationship, eg $\frac{2}{6}$ oe or $\frac{3}{8}$ oe **or** 2 : 4 oe or 3 : 5 oe or 2 : 6 oe or 3: 8 oe	Allow use of words to describe relationship, eg 2 out of 6
		P1	for process to express both relationships, eg $\frac{2}{6}$ oe and $\frac{3}{8}$ oe **or** 2 : 4 oe and 3 : 5 oe or 2 : 6 oe and 3: 8 oe	
		C1	for indicating (number greater than 5 on) spinner supported by correct values, eg $\frac{8}{24}$ and $\frac{9}{24}$ **or** 0.33(3..) and 0.37(5) **or** 33(.3..)% and 37(.5)% **or** 10 : 20 and 12 : 20 or 16 : 48 and 18 : 48	Conclusion may be indicated in body of question eg circling spinner or phrase

7	(a)	evens	C1	oe	
	(b)	certain	C1	oe	
	(c)	0.6	B1	oe	Accept 60% or an equivalent fraction eg $\frac{6}{10}$

9	(i)	$\frac{9}{22}$	B1	oe	If incorrect notation used in both (i) and (ii), penalise once only in (i)
	(ii)	$\frac{14}{22}$	B1	oe eg $\frac{7}{11}$	
	(iii)	0	B1		

Paper: 1MA1/1F

11	(a)	Unlikely	B1	cao	
	(b)	Evens	B1	cao	

15 (a)		B3 (B2 (B1	for a fully correct frequency tree for at least 4 figures correctly placed) for at least 1 figure correctly placed)	If probabilities used instead of frequencies award a maximum of B2
(b)	$\frac{57}{64}$	M1 A1	$\frac{a}{64}$ where $0 < a < 64$ and a is an integer (ft) **or** $\frac{57}{b}$ where $b > 57$ and b is an integer (ft) (ft) for $\frac{57}{64}$ oe	Must be values from their diagram with numerator < denominator Accept probabilities given as equivalent fractions, 0.89(06…) or 89(.06..)%

Paper: 1MA1/3F

21	80	M1 A1	for complete method, eg 200×0.4 or for $\frac{80}{200}$ for the answer cao	

13	(a)	1	B1	Allow 100%	Allow $\frac{k}{k}$ Do not accept 100, do not accept certain.
	(b)	$\frac{2}{3}$	P1	for start of process to write down proportion of each coin, writes down a correct ratio, eg 1p : 2p = 2 : 1 oe **or** a process to work out number of 1p coins **and** 2p coins, eg 40 ÷ 2 (= 20) **and** (40 ÷ 2) ÷ 2 (= 10) **or** assigns numbers in correct proportion, eg 6 1p coins **and** 3 2p coins **or** finding the probability of a 2p coin $\left(=\frac{1}{3}\right)$	
			A1	for $\frac{2}{3}$ oe	Accept any equivalent fraction, decimal form, 0.66(6…) or 0.67 or percentage form, 66(.6…)% or 67%

Answer 106 | Mark scheme

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
11	No with reason	C1	No with reason **Acceptable reasons:** (The sections are) not the same size **or** the angles are not the same (The arrow is) more likely to land on 1 or 3 than on 2 (The probability for) 2 should be ¼ 2 has a 90° angle but 1 and 3 both have obtuse angles **or** 135° each 2 has a 90° angle but the others are bigger 2 has a smaller area (the sections have) different sizes/angles/areas (the spinner is) not split equally (the angle for) 2 would be 120 not 90 (The angle for) 2 would be 120 or all angles would be 120 (landing on) 2 is less than a third the chances for the other two are higher than (for) 2 **Not acceptable:** Yes with any reason given No it should be $\frac{2}{3}$ (No because) 2 has a 90° angle the bigger the angle the more likely	

Question	Answer	Mark	Mark scheme	Additional guidance
23	70	P1	for process to find number of discs in the bag, eg $24 \div 0.16$ (= 150) **or** for process to find the total probability of red or blue, eg $1 - 0.16$ $\left(=0.84 \text{ or } \frac{21}{25} \text{ oe}\right)$	May be implied by 126
		P1	for process to work with ratio, eg ([total] – 24) ÷ (5 + 4) (= 14) **or** for a process to find the probability of red, eg $[\text{probability}] \div (5+4) \times 5$ $\left(= 0.46\ldots \text{ or } \frac{7}{15}\right)$	0.46 or better or 0.47 may imply P2 [total] can be any integer [probability] can be any value less than 1
		P1	for a complete correct process to find the number of red discs, eg "14" × 5 **or** "0.46…" × 24 ÷ 0.16 **or** an answer of $\frac{70}{150}$	If correct processes seen to find the total for both red and blue or 70 : 56 award P3 Must come from correct use of probability and ratio in either order
		A1	for 70	If the values for red and blue are found, the value for red must be clearly identified as the answer to gain A1

Paper: 1MA1/2F

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
11 (a)	110 70 100 280 90 80 50 220 200 150 150 **500**	C3 (C2 (C1	for a fully correct table for 6 or 7 or 8 or 9 or 10 correct entries) for 3 or 4 or 5 correct entries)	
(b)	$\frac{100}{500}$	M1	for $\frac{a}{500}$ where $0 < a < 500$ **or** for $\frac{100}{b}$ where $100 < b \leq 500$ **or** ft their table	100:500 scores M1A0 For M1 ft their table this is for $\frac{\textit{their}\text{ value of adult action from table}}{c}$ where *their* value of action adult $< c \leq 500$
		A1	for $\frac{100}{500}$ oe or ft their table	For A1 ft their table is for $\frac{\textit{their}\text{ value of adult action from table}}{500}$

Question	Answer	Mark	Mark scheme	Additional guidance
19 (a)	75	P1	for process to find sum of unknown probabilities eg 1 – (0.10 + 0.30 + 0.05 + 0.25) (= 0.3) oe or for process to find number of times dice lands on 3, 4, 5 or 6 eg (0.10 + 0.30 + 0.05 + 0.25) × 500 (= 350) oe	Award mark for any two probabilities that sum to 0.3 eg in the table or probability of 2 = 0.15
		P1	for a complete process, eg (“0.3” ÷ 2) × 500 oe or (500 – “350”) ÷ 2 oe	P1P1A0 for answer of 75:500 or $\frac{75}{500}$
		A1	cao	
(b)	Answer to part (a) will be greater	C1	for an explanation that the answer will be greater **Acceptable examples** It makes the answer an underestimate The number will be higher The answer will increase / will go up The number of 2’s will increase It would be more than [75] **Not acceptable examples** My answer will change My answer is incorrect The calculation will change The probability will change It would make the probability of 2 go up My answer won’t change	Where [75] is their answer to (a)

Paper: 1MA1/1F

7	(a)	12	M1	for method to find mean, eg (14 + 10 + 10 + 13 + 15 + 9 + 15 + 10) ÷ 8 **or** 96 ÷ 8	Allow one error or omission but must divide by 8
			A1	cao	
	(b)	6	M1	for 15 – 9 **or** 9 – 15 **or** 9 to 15	Condone eg 9, 15 but not 9 + 15
			A1	cao	
	(c)	cross at ¼	B1	for cross (or mark) at ¼	Accept any mark near to ¼ if the intention is clear; do not accept if additional marks are shown

Paper: 1MA1/2F

16	Box B and correct figures	P1	for process to find one probability or proportion, eg $\frac{10}{10+30}\left(=\frac{10}{40}\right)$ **or** $\frac{7}{7+18}\left(=\frac{7}{25}\right)$	Accept 10 : 30 or 7 : 18
		P1	(dep P1) for process to find figures to compare using a common format, eg 10 ÷ [40] (= 0.25) **and** 7 ÷ [25] (= 0.28) **or** 10 ÷ [40] × 100 (= 25) **and** 7 ÷ [25] × 100 (= 28) **or** $\frac{10}{[40]}=\frac{25}{100}$ oe **and** $\frac{7}{[25]}=\frac{28}{100}$ oe **or** $\frac{10\div10}{[40]\div10}\left(=\frac{1}{4}\right)$ **and** $\frac{7\div7}{[25]\div7}\left(=\frac{1}{3.57...}\right)$	Accept eg 30 : 90 **and** 35 : 90 [40] is any value >10 [25] is any value >7 but one probability or proportion must be correct from previous P1
		C1	(dep on P2) for Box B **and** correct comparative figures, eg 0.25 and 0.28 **or** 25% and 28%	Comparative figures may be probabilities, ratios or comparative proportions eg box A: 70R and 210G and box B: 70R and 180G

Paper: 1MA1/2F

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
20 (a)	0.4 oe	P1	for 1 – 0.3 – 0.1 (= 0.6) **or** 0.3 + 0.1 + 2x + x = 1	Award this mark for any two probabilities that sum to 0.6
		P1	for "0.6" ÷ 3 (= 0.2) **or** 3x = "0.6" **or** for "0.6" ÷ 3 × 2	Allow P1P1A0 for P(green) = 0.4 Award P1P1A0 for 0.4 with incorrect subsequent working eg $\frac{0.4}{0.6}$
		A1	for 0.4 oe	If no answer on answer line then check table A0 for $\frac{0.4}{1}$
(b)	150	M1	for complete method to find the total number of counters eg 45 ÷ 0.3 or 45 ÷ 3 × 10 oe or 45 + 45 ÷ 3 + 45 ÷ 3 × 4 + 45 ÷ 3 × 2 (= 45 + 15 + 60 + 30)	ft their table
		A1	cao	

Question	Answer	Mark	Mark scheme	Additional guidance
15	10	P1	for process to find total number of buttons 20 + 12 (= 32)	
		P1	for process to work with probability, eg “32” ÷ 4 (= 8) **or** “32” ÷ 4 × 3 (= 24)	May be implied by $\frac{"8"}{"32"}$
		P1	for process to find number of extra blue buttons required, eg “8” – 6 (= 2) **or** for process to find number of extra reds, eg 12 – (“8” – 6) **or** for process to find new total number of red buttons, eg (6 + 5 +12) – “8” (= 15) or “32” – “8” – 9 (= 15) or “24” – 9 (= 15)	May be implied by 8 : 9 : 15 or $\frac{"10"}{"32"}$
		A1	(dep P2) cao	Answer of 10 only scores no marks

7	(a)	Mark at $\frac{1}{6}$	B1	for mark at $\frac{1}{6}$	Accept indications other than a cross, eg an arrow pointing to the correct position.
	(b)	Mark at $\frac{2}{6}$	B1	for mark at $\frac{2}{6}$	

Paper: 1MA1/3F

Paper: 1MA1/3F

Question	Answer	Mark	Mark scheme	Additional guidance
17 (a)	37, 83 21, 16, 44, 39	B3	for a fully correct frequency tree	If probabilities used instead of frequencies then maximum of B2 can be awarded
		(B2	for at least 4 correct values in the frequency tree)	
		(B1	for at least 1 correct value in the frequency tree)	
(b)	$\frac{83}{120}$	B1	for $\frac{83}{120}$ oe or ft from frequency tree	Accept equivalent fraction or decimal or percentage forms of probability eg 0.69(…) or 69(…)%

Paper: 1MA1/3F

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Mark Scheme (Results)

March 2013

GCSE Mathematics (Linear) 1MA0
Foundation (Calculator) Paper 2F

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii) *select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect cancelling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.
Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

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10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

12 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

PMT

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		7025	1	B1 cao
	(b)		Nine thousand four hundred (and) fifty	1	B1 for Nine thousand four hundred (and) fifty Accept 'nine thousand' written as '9 thousand', 'four hundred' written as '4 hundred' and 'fifty' written as '5 tens' or any mixture of these. Do not penalise poor spelling.
	(c)		29	1	B1 for 29 or twenty nine or 29.0
	(d)		7000	1	B1 for 7000 or 7 thousand or seven thousand
2	(a)		8, 10	1	B1 cao
	(b)		24	1	B1 cao
	(c)		reason	1	B1 for a valid reason that demonstrates the understanding that the number of triangles is twice the pattern number
3	(a)		240	1	B1 for 240
	(b)		arrow at 125°C	1	B1 for arrow (or line) pointing within a range of 122.5 to 127.5 (ie nearer to 125 than either 120 or 130) Use professional judgement.
	(c)		6.05 (pm)	1	B1 for 6.05 (pm) oe

PMT

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
4	(a)		Thursday	1	B1 cao
	(b)		7	1	B1 cao
	*(c)		Nick	3	M1 for the intention to add Dave's 4 times or Nick's 4 times A1 for 58 and 64 C1 (dep on M1 and two totals) for clearly stating Nick as their answer or ft from their two totals OR M1 for the intention to find the difference between the times on each of the 4 days A1 for 6 or −6 C1 (dep on M1 and a net difference) for clearly stating Nick as their answer or ft from their difference [SC: B1 for "Nick spent 6 minutes more than Dave on his phone" if M0 scored.]
5			9 squares shaded	1	B1 for any 9 squares shaded oe
6			66	2	M1 for a correct method to find the number of people on the bus if the 15 get off first. (= 57) A1 cao OR M1 for a correct method to find the number of people on the bus if the 9 get on first. (= 81) A1 cao OR M1 for a correct method to find the net change in the number of people on the bus (= 6 or −6) A1 cao

PMT

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
7		20 − 6.65 13.35 ÷ 3	4.45	3	M1 for a correct method to find the amount shared by B, R and T M1 (dep) for a correct method of dividing this amount by 3 A1 cao [SC: B1 for an answer of 17.78 (20 – 6.65 ÷ 3), if M0 scored, with or without working]
8	(a)		3, 6, 9, 3	3	B3 for a table showing all 4 correct frequencies in the correct place. (condone the absence of or any incorrect tallies) [(B2 for 2 or 3 correct tallies or 2 or 3 correct frequencies even in the wrong columns) (B1 for 1 correct tally or 1 correct frequency even in the wrong column)] [SC: B2 for 3/21 and 6/21 and 9/21 and 3/21 shown in the frequency column]
	(b)		3	1	B1 for 3 or ft table in (a)
9			Circle radius 5 cm drawn	1	B1 for a circle of radius 5 cm drawn (condone an alternative centre)

PMT

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
10	(i)		5,15 or 5,125 or 15,125 or 30,50 or 30,60 or 30,90 or 30,100 or 50,60 or 50,90 or 50,100 or 60,90 or 60,100 or 90,100	4	B1 for 2 numbers, from the list, whose sum is an even number.
	(ii)		60 or 100		B1 for 60 or 100 or both
	(iii)		5 or 15		B1 for 5 or 15 or both
	(iv)		125		B1 cao
11		9.39 × 10 24.30 × 3 + 9.39 93.90 − 82.29	£11.61	5	M1 for a correct method to find the most expensive way to buy the 10 cartridges (= 93.90) M1 for a correct method to find the least expensive way to buy the 10 cartridges (= 82.29) M1 (dep on M1 scored) for a correct method to find the difference between their least and their most expensive way, provided that both totals are for the cost of exactly 10 cartridges A1 for 11.61 B1 (indep) for correct units

PMT

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
12	(a)(i)		B and D	2	B1 cao
	(ii)		G and E		B1 for G and E (allow B and D if not in (i))
	(b)	3 + 3 + 3 + 2 + 2 +1 + 1 + 1	16	1	B1 cao
13	(a)		6am	1	B1 for 6am (accept −4) Do not accept 6 alone.
	(b)		3	1	B1 for 3 (allow − 3)
	(c)	−1−5	−6	2	M1 for −1 − 5 or intention to subtract 5 from -1 (may be shown on a diagram) A1 cao

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1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*14			Yes + supporting work	4	M1 for adding the weights of all the ingredients (= 96) M1 (dep) for '96' × 8 A1 cao for 768 C1 (dep on M2), ft for a correct conclusion (yes or no) from a comparison of 750 (pots) with their '768' pots; units must be quoted [SC: B1 for 768 seen without working if M0M0 scored] **OR** M1 for adding the weights of all the ingredients (= 96) M1 for 750 ÷ 8 A1 cao for 93.75 C1(dep on M2), ft for a correct conclusion (yes or no) from a comparison of their weight of ingredients in one tank full '93.75' kg with '96' kg; units must be quoted [SC: B1 for 93.75 seen without working if M0M0 scored]] **OR** M1 for adding the weights of all the ingredients (= 96) M1 (dep) for 750 ÷ '96' A1 cao for 7.8125 C1(dep on M2), ft for a correct conclusion (yes or no) from a comparison of their number of pots, '7.8125' pots with 8 (pots); units must be quoted [SC: B1 for 7.8125 seen without working if M0M0 scored]]
15			85 29 54 **168** **93** 31 47 171 13 5 **9** **27** 191 **65** **110** 366	3	B3 for fully correct table (B2 for 3 or 4 or 5 correct entries, B1 for 1 or 2 correct entries)

PMT

1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
16	(a)(i)		5	3	B1 cao
	(ii)		8		B1 cao
	(iii)		5		B1 cao
	(b)		correct sketch	2	B2 for fully correct sketch [B1 for a square (or rectangle) drawn with 2 or 3 connecting triangles on the outside of the square]
17	(a)(i)		12.978(61279…)	2	B1 for 12.978(…..)
	(ii)		13		B1 for 13 or ft from a(i) [Note: An answer of 13.0 gets B0]
	(b)		100000	1	B1 cao
18	(a)	$2 \times 8 = 16$ $16 + 7$	23	2	M1 for correct substitution of 8 into the expression $2f$ A1 cao
	(b)	$3 \times -2 + 5 \times 4$	14	2	M1 for correct substitution into the formula A1 cao

PMT

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
19	(a)		$\frac{40}{360}$	1	B1 for $\frac{40}{360}$ oe (ignore any incorrect simplification) Accept 0.11…. if no fraction shown
	(b)		4	3	M1 for a correct method to find the angle of the 'weeding' sector If measured, accept an angle between 138 and 142 inc. M1 (dep) for a correct method to find the number of degrees per hour (= 20) or the number of hours ($\frac{1}{20}$ (3 mins) per degree A1 cao for 4
20	(a)		2.5	2	M1 for 10 (cm) or "10" ÷ 4 A1 for 2.45 – 2.55
	(b)		A marked on diagram	2	M1 for a point marked (or line drawn) on a bearing of 038° from either point B or point W, OR for a point marked (or arc drawn) 6 cm from B A1 for the position of Avebury marked (accept without label if not ambiguous)

PMT

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
21	(a)		30	1	B1 for 30 minutes oe
	(b)		20	1	B1 cao
	(c)		graph completed	2	B1 for horizontal line from (5, 20) to (5.30, 20) B1 for a single straight line with the correct gradient from '(5.30, 20)' to the time axis
22	(a)		$x = 3$ drawn	1	B1 for $x = 3$ drawn [Note: each line drawn must be a single line segment satisfying $x = 3$]
	(b)		$y = x$ drawn	1	B1 for $y = x$ drawn [Note: each line drawn must be a single line segment satisfying $y = x$]
	(c)	Gradient = $\frac{3-0}{0--2}$	1.5	2	M1 for a method to find the gradient of the given line A1 for 1.5 oe
23	(a)		n^8	1	B1 for n^8 (accept n^{5+3})
	(b)		n^5	1	B1 for n^5 (accept n^{7-2})

PMT

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
24	(a)	15 ÷ 6	2.5	2	M1 for 15 ÷ 6 oe A1 for 2.5 or $2\frac{1}{2}$
	*(b)		Yes + evidence	2	M1 for a correct method to change 15 miles into kilometres C1(dep on M1) for 24 km **and** statement with correct conclusion [SC: B1 for "Yes" oe and 24 km shown if M0 scored] **OR** M1 for a correct method to change 20 kilometres into miles C1(dep on M1) for 12.5 miles **and** statement with correct conclusion [SC: B1 for "Yes" oe and 12.5 miles shown if M0 scored]

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
25			414.96	5	M1 for a correct method to work out the amount of oil required to fill the tank M1 for a correct method to find the cost of oil required before the discount M1 for a correct method of finding 5% of their calculated cost M1 (dep on previous M1) for a correct method to find the discounted cost A1 for correct answer of 414.96 or 41496p **OR** M1 for a correct method of finding 5% of the cost of 1 litre of oil M1 (dep on previous M1) for a correct method to find the discounted cost of 1 litre of oil M1 for a correct method to work out the amount of oil required to fill the tank M1 for a correct method to find the discounted cost of the oil required A1 for correct answer of 414.96 or 41496p **OR** M1 for a correct method to work out the amount of oil required to fill the tank M1 for a correct method of finding 5% of their calculated amount of oil M1 (dep on previous M1) for a correct method to find the reduced amount of oil M1 for a correct method to find the cost of the reduced amount of oil A1 for correct answer of 414.96 or 41496p

PMT

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
26	(a)	$1 - 0.2 - 0.1$ $0.7 \div 2$	0.35	3	M1 for correctly using total probability 1 or 100% if percentages used M1 (dep) for complete correct method to complete the solution A1 for 0.35 or 35% or $\frac{35}{100}$ oe
	(b)	0.1×200	20	2	M1 for 0.1×200 A1 cao [SC: B1 for an answer of $\frac{20}{200}$ if M0 scored]
27	(a)		$3x + 12$	1	B1 for $3x + 12$ or $12 + 3x$
	(b)		$x^3 + 2x$	2	M1 for the intention to multiply both terms in the bracket by x A1 for $x^3 + 2x$ OR B2 for $x^3 + 2x$ [B1 for x^3 or $2x$ seen]
	(c)		$x(x - 6)$	1	B1 for $x(x - 6)$ or $(x - 6)x$

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1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
28			1180	3	M1 for a correct method to find the area of the cross section M1 (dep) for a complete correct method for the volume of the prism A1 cao OR M1 for a correct method to find the volume of one cuboid M1 (dep) for a complete correct method for the volume of the prism A1 cao

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Mark Scheme (Results)

November 2013

Pearson Edexcel GCSE
In Mathematics Modular (2MB01)
Unit 1: (5MB1F_01) Foundation (Calculator)

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii) *select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate.*
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.
Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations
Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

12 Parts of questions
Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers
Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

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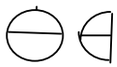
PAPER: 5MB1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		24	1	B1 cao
	(b)		22	2	M1 for 8 + 8 + 6 oe or "24" − 2 A1 cao
	(c)			1	B1 for drawing a circle showing 4 quadrants and a semicircle showing 2 sectors
2	(a)		evens	1	B1 cao
	(b)		unlikely	1	B1 cao
	(c)		1 marked	1	B1 for cross marked at 1
	(d)		colours	1	B1 for 2 or 3 additional counters marked red
*3	(a)		diagram or chart	4	B1 for a key or suitable labels to identify Harry and Shamus B1 for horizontal or vertical axis labelled B1 for at least 3 correct plots C1 for fully correct diagram(s) or charts(s)
	(b)		comparisons	2	B1, B1 ft for any two correct comparisons.

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$\frac{1}{4}$

PAPER: 5MB1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
4			7.31	4	M1 for a correct method to work out the total cost (= 16.92) M1 for a correct method to find $\frac{1}{4}$ of their total cost (or $\frac{3}{4}$) M1 (dep on at least M1) for subtraction from £20 A1 cao
5	(a)		2	2	M1 for attempt to order or two middle unordered numbers selected A1 cao
	(b)		4	2	M1 for 5 – 1 or 1 – 5 or 1 to 5 A1 cao
	(c)		18 11 7 3 1	1	B1 cao
	(d)		40	1	B1 for 40 or ft their frequencies
	(e)	18×0 + 11×1 + 7×2 + 3×3 + 1×4 =	38	2	M1 for Σ *fx* A1 cao [SC: no working- B1 for 56]
*6			No	2	M1 for a relevant calculation, eg 60 +30 or 95 ÷ 60 (= 1.58…) or sight of 90 C1 (dep on M1) for correct statement with correct calculations
7	(a)		(A1), A2, A3 B1, B2, B3 C1,C2 C3	2	B2 for a fully correct list (B1 for 5 or 6 more correct. Ignore repeats)
	(b)		$\frac{1}{9}$	1	B1 for $\frac{1}{9}$ oe or ft part (a)

PAPER: 5MB1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
8	(a)		$\frac{1}{4}$	1	B1 for $\frac{1}{4}$ oe
	(b)		$2x°$	1	B1 for $2x°$ oe (condone omission of °)
	(c)		20	2	M1 for $150 \div 360 \times 48$ oe or $48 \div 4 + \frac{2}{3} \times (48 \div 4)$ oe A1 cao
*9			Investment B	4	M1 for 3×12×5 (= 180) M1 for 2500 × 3 × 2.5 ÷ 100 (= £187.50) A1 for (£)180 and (£)187.5(0) or (£)2680 and (£)2687.5(0) C1 (dep on M2) for correct conclusion for their figures Alternative method: M1 for 12 × 5 = 60 M1 for '60'÷ 2500 × 100 A1 for 2.4(%) C1 (dep on M2) for correct conclusion for their figures NB: accept comparable figures for different time periods SC: If compound interest used can score M1 M0 A0 C1 ft

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PAPER: 5MB1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
10	(a)	<table><tr><td>4</td><td>**15**</td><td>**11**</td><td>**30**</td></tr><tr><td>**12**</td><td>5</td><td>**10**</td><td>27</td></tr><tr><td>**16**</td><td>20</td><td>21</td><td>57</td></tr></table>	complete 2-way table	3	B3 cao (B2 for 4 or 5 correct entries B1 for 2 or 3 correct entries)
	(b)		5	1	B1 cao
	(c)		19	1	B1 for 19 or ft 4 + "15" or 30 – "11"
11	(a)		question + response boxes	2	B1 for appropriate question with time period B1 for at least 3 boxes that are either non-overlapping but not necessarily exhaustive, or exhaustive but not necessarily non-overlapping NB time period and/or unit of time may appear in either the question or with the response boxes; award a maximum of B1 if no units
	(b)		two correct reasons	2	B2 for 2 correct reasons from, eg only girls, (all about) the same age, same year group, same school (B1 for 1 correct reason)
12	(a)		$0.75 - x$	2	M1 for $1 - 0.25 + x$ or $0.25 + x$ A1 or $0.75 - x$ oe
	(b)		60	2	M1 for 0.25×240 oe A1 cao

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PAPER: 5MB1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
13	(a)		Positive correlation	1	B1 for positive correlation or the greater the rainfall the more umbrellas sold oe
	(b)		52 – 58	2	M1 for a single straight line segment with positive gradient that could be used as a line of best fit or an indication on the diagram from 28 on the *x*-axis A1 for an answer in the range of 52 – 58
*14		2 × 462 + 251 = 1175 0.95×1175 = 1116.25 2 × 485 + 218 = 1188 1188 – 75 = 1113.00	Jetstream	5	M1for identifying correct costs for either Highway Airlines or Jetstream Airlines M1 for attempt to calculate the costs for the family eg 2× “462” “251” or 2 × “485” + “218” M1 for a correct method to work out the discount for one company eg 0.95 × “1175” or 0.05 × “1175” or “1188” – 75 A1 for (£)1116.25 and (£)1113.00 C1 (dep on M1) for calculations clearly identified with each airline and correct decision from their figures

Modifications to the mark scheme for Modified Large Print (MLP) papers.

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The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5°
Measurements of length: ±5 mm

PAPER:			
Question		**Modification**	**Notes**
Q1		Circles are 2.5cm diameter. Key at top of pictogram.	Standard mark scheme
Q2	(c)	Probability scale is 16cm long.	Standard mark scheme
Q3		Grid is 2cm squares.	Standard mark scheme
Q4		No pictures just information given.	Standard mark scheme
Q10		Braille table has (i) to (vi) in spaces. 4 (i) (vi) (ii) (iv) 5 (v) 27 (iii) 2 21 57	Standard mark scheme
Q13		*x* axis 2cm for 5. *y* axis 2cm for 10. *x* changed to filled in circles. Right axis labelled.	Standard mark scheme
	(b)	Rainfall changed from 28mm to 30mm.	Standard mark scheme
Q14		On both tables top 2 rows and bottom 2 rows removed.	Standard mark scheme

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Mark Scheme (Results)

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The strands are as follows:

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Partial answers shown (usually indicated in the ms by brackets) can be awarded the method mark associated with it (implied).
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Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
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If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded (embedded answers).

12 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

14 The detailed notes in the mark scheme, and in practice/training material for examiners, should be taken as precedents over the above notes.

Guidance on the use of codes within this mark scheme
M1 – method mark for appropriate method in the context of the question A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

PAPER: 5MB1F_01				
Question	**Working**	**Answer**	**Mark**	**Notes**
1. (a)		20	1	B1 cao
(b)		14	1	B1 cao
(c)		2 squares	2	B1 for 2 squares
		$4\frac{1}{2}$ squares		B1 for $4\frac{1}{2}$ squares
2. (a)		8	1	B1 cao
(b)	6+5+8+6+7+7+8 +8+8+6 = 69 69÷10	6.9	2	M1 for complete correct method to find mean e.g. sum ÷ 10 A1 for 6.9
(c)		3	2	M1 for 8 − 5 or 5 − 8 or −3 A1 cao
(d)		No with reason	1	B1 for No and reason e.g. 7 is between highest and lowest
3. (a)		Reed Farm	1	B1 cao
(b)		Rosewood	1	B1 cao
(c)		£545	1	B1 cao

PAPER: 5MB1F_01				
Question	**Working**	**Answer**	**Mark**	**Notes**
4.		£4.45	3	M1 for adding 3 different prices (e.g. 3.00 + 3.50 + 2.95 (= 9.45)) or selecting the 3 highest prices M1 for complete method to find difference between total of 3 highest normal prices and £5 A1 cao
*5.		Diagram or chart	4	M1 for key or suitable labels to identify max and min M1 for 5 correct day labels or a linear scale M1 for diagram or chart (combined or separate) set up for comparison, correctly showing data for at least 3 days C1 for fully correct diagram or chart with axes correctly scaled and labelled
6. (a)		1418	1	B1 cao
(b)		Correct plan showing departure times and arrival times for 2 train journeys.	4	B1 for a departure time from Cromer of 10 57, 11 57 or 12 57 M1 for an arrival time at Norwich which is no later than 13 41 M1 for adding 30 minutes to 16 55 or correct departure time. A1 all train departure and arrival times correct (10 57 and 11 41 or 11 57 and 12 41 or 12 57 and 13 41 AND 17 45 (and 18 36))
7. (a)		Cross at $\frac{3}{10}$	1	B1 for cross at $\frac{3}{10}$
(b)		Cross at 0	1	B1 for cross at 0
(c)		I	1	B1 cao
8.		3	2	M1 for working out or using a correct duration of time. A1 cao

PAPER: 5MB1F_01				
Question	**Working**	**Answer**	**Mark**	**Notes**
9.		Correct pairs 3,7 or 4,6 or 2,8 or 5,5	2	B2 for 2 pairs from 5,5 or 3,7 or 4,6 or 2,8 (B1 for one pair) (Note: Condone non-integers if correct pair(s) given)
*10		London is more expensive	4	M1 for reading from the graph, e.g. £10 = €12 or €7 = £5.80 M1 for a complete method to convert either £60 into € or €70 into £ A1 for answer in interval €71 to €72 or in interval £57 to £59 C1 ft (dep on M1) for correct conclusion for their figures using consistent units
11.		165	3	M1 for correct method to find 5% of 300 or $\frac{2}{5}$ of 300 M1 (dep) for 300 – "15" – "120" A1 cao OR M1 for 1 – 0.05 – 0.4 (= 0.55) M1 (dep) for "0.55" × 300 A1 cao

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PAPER: 5MB1F_01				
Question	**Working**	**Answer**	**Mark**	**Notes**
12. (a)		22	1	B1 cao
(b)		23	3	M1 for correct method to find total women who came by bus, e.g. 13 – 6 (=7) M1 for correct method to find women who came by train, e.g. 22 – 7 – 4 (=11) A1 cao OR M1 for correct method to find men who came by car, e.g. 28 – 6 – 12 (= 10) M1 for correct method to find total who came by car, e.g. 10 + 4 (= 14) A1 cao
(c)		$\frac{3}{7}$	2	M1 for $\frac{12}{28}$ oe A1 oe
13.		30	2	M1 for 0.6 × 50 oe A1 cao
14.		$\frac{x+x+5+2x}{3}$	2	M1 for intention to add x, $x + 5$, $2x$ or $4x + 5$ seen or ambiguous answer, e.g. "$4x + 5$" ÷ 3 A1 for $\frac{x+x+5+2x}{3}$ oe

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PAPER: 5MB1F_01				
Question	**Working**	**Answer**	**Mark**	**Notes**
15. (a)		2 different reasons	2	B1 for a reason relating to: Bias – due to gender or due to railway station location Size of sample too small B1 for one other reason
(b)		Question and response boxes	2	B1 for a suitable question with time period and units in question or response boxes B1 for at least 3 non-overlapping and exhaustive response boxes
16.		12 | 3 5 9 13 | 0 3 3 5 7 8 14 | 7 7 8 9 15 | 0 1	3	B2 for a fully correct ordered diagram (B1 for correct unordered diagram or ordered with at most two errors) B1 for correct key eg 12 | 3 means 123 (cm)
17. (a)		Point at (47, 34)	1	B1 point plotted
(b)		Positive	1	Positive (correlation)
(c)		48 to 51 inclusive	2	M1 for a single straight line segment with positive gradient that could be used as a line of best fit or a horizontal line from 35 or point marked at (n, 35) A1 for given answer in the range 48 – 51

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PAPER: 5MB1F_01			
Question		**Modification**	**Notes**
1		Key top left. Pictures size x 2½	
3		Table: Location column removed	
5		Table: Friday row removed, Saturday – 17 changed to 12 Grid: Vertical axis – 15 x 2 cm squares, horizontal axis 10 x 2 cm squares Room left for labelling on the left and below.	
6		Table: North Walsham now removed from both tables. 1057 and 1557 removed from Cromer to Norwich 1445 and 1955 removed from Norwich to Cromer	
7		Probability scales lengthened	
10		1½ cm grid. Inside measurements of squares are 1.4 cm. Right axis labelled	

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PAPER: 5MB3H_01			
Question		**Modification**	**Notes**
12		Braille: (i) is put in total women and (ii) in train total	
16		Diagram enlarged. 4th horizontal line drawn in at the bottom.	
17		1½cm grid. Inside measurements of squares are 1.4 cm. Crosses changed to filled in circles. Right axis labelled	

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In Mathematics A (1MA0)
Foundation (Non-Calculator) Paper 1F

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Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

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It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect cancelling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded (embedded answers).

12 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

14 The detailed notes in the mark scheme, and in practice/training material for examiners, should be taken as precedents over the above notes.

Guidance on the use of codes within this mark scheme
M1 – method mark for appropriate method in the context of the question A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		Lhotse	1	B1 cao
	(b)		8200	1	B1 cao
	(c)		Seven thousand four hundred and twenty-eight	1	B1 for any unambiguous answer
	(d)		8051	1	B1 cao
2	(a)		4,8,3,3,2	2	M1 for at least 2 tallies or 2 frequencies correct A1 for 5 correct frequencies
	(b)		correct graph	3	M1 for bar chart or other suitable chart with at least 2 correct frequencies drawn for their scale (ft from (a)) M1 for all bars labelled and vertical axis correctly scaled A1 for accurately representing their data, with all labels, ft from (a)
3	(a)		56 000	1	B1 cao
	(b)		276	1	B1 cao
	(c)		6	1	B1 cao
	(d)		29	1	B1 cao
	(e)		13	1	B1 cao

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
4			3	3	M1 for attempt to find number of bags needed eg 254 ÷ 20 oe (= 12.7) **or**12 **or** 13 M1 (dep) for "254 ÷ 20" ÷ 5 oe (= 2.4) A1 cao **OR** M1 for 5 × 20 (=100) M1 (dep) for intention to find how many "100" in 254 (= 2.54) A1 cao
5	(a)		B or C	1	B1 for B **or** C **or** B and C
	(b)		G, E	2	B1 for G; B1 for E
	(c)		Hexagon	1	B1 cao
	(d)		Parallelogram	1	B1 cao
6	(a)		$3m$	1	B1 cao
	(b)		$7e$	1	B1 cao
	(c)		$15g$	1	B1 cao
7	(a)		31	2	M1 for 3 × 5 + 2 × 8 **or** 15 and 16 A1 cao
	(b)		$6x + 8y$	2	M1 for $6x$ **or** $8y$ A1 for $6x + 8y$ oe as final answer

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*8		Tables-R-Us 120 + (120 + 2 × 40) = 320 Fred's Furniture 120 + (32 × 6) = 312 Tables 'n Chairs 120 + (3 × 70) = 330	Fred's Furniture with working	4	M1 for correct method to find total cost of chairs (and table) for at least one shop M1 for correct method to find total cost of chairs (and table) for at least two shops A1 for 3 comparable totals (eg. chairs £200, £192, £210 **or** table and chairs £320, £312, £330) C1 (dep on M1) ft for correct statement with shop name from comparable figures
9			48	2	M1 for method to find 15% of 320 A1 cao
10	(a)		5	1	B1 cao
	(b)		evens	1	B1 cao
	(c)		$\frac{2}{6}$ oe	2	M1 for $\frac{a}{6}$ where $a < 6$ **or** $\frac{2}{b}$ where $b > 2$ A1 for $\frac{2}{6}$ oe
11	*(a)		No with working	2	M1 for 19.5 + 22.8 (= 42.3) **or** 40 − 19.5 − 22.8 (= −2.3) **or** 22 + 19 (= 41) C1 for statement with No and 42.3 **or** ±2.3 **or** 41 seen
	(b)		12 40	3	M1 for correct start eg. addition of two times **or** subtraction of one time from 1430 M1 for a complete method A1 for 12 40 (pm)

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
12			126 or 176	4	M1 for correct unit conversion of 2 m or 3 m or 20 cm M1 for method to find number in width or number in length **or** 14 or 9 or 16 or 11 M1 (dep on M1) for "number in length" × "number in width" eg 14 × 9 eg 16 × 11 A1 for 126 or 176
*13			Amsterdam with figures	3	B1 for a correct conversion from miles to km or km to miles eg 8 km = 5 miles eg 28 miles = 44 km M1 for a correct method to convert 280 miles to km or 500 km to miles **or** 420 – 460 (km) **or** 300 − 320 (miles) C1 (dep on M1) for statement with correct conclusion and correct conversions (420 – 460 km or 300 – 320 miles)
14			correct shape	2	M1 for at least 2 correctly enlarged sides A1 for correct shape **SC:** B1 for a fully correct enlargement scale factor 2 or 4
15	(a)		18	1	B1 cao
	(b)		56	1	B1 cao
	(c)		33	2	M1 for 23 and 56 identified A1 cao

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*16			No with reason	3	M1 for 17, 20 .**or** + 3 **or** $3n + 2$ M1 for method to show that 34 is not in the sequence eg continue sequence to at least 32 eg attempt to solve $3n + 2 = 34$ C1 (dep on M2) for statement with conclusion eg No with 32, 35 shown eg $n = 32 \div 3$ which is not a whole number
17			700 cm^3	3	M1 for $20 \times 5 \times 7$ A1 for 700 B1 (indep) for cm^3
18			4	3	B1 for 11.8 − 12.2 (cm) or 1180 − 1220 (km) M1 for "12" × 100 ÷ 300 oe A1 for 3.9 – 4.1 from correct figures or ft from "12" × 100 ÷ 300 oe
19			1340	4	M1 for 500 × 4 (= 2000) M1 for 960 – 300 (= 660) or "2000" + 300 (= 2300) or "2000" – 960 (= 1040) M1 (dep on M2) for a fully correct method eg "2000" – "660" or "2300" – "960" or "1040" + 300 A1 cao

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
20	(a)		$\frac{5}{12}$	2	M1 for $\frac{150}{360}$ or equivalent fraction A1 cao
	(b)		42	2	M1 for 60 ÷ 12 (= 5) **or** 210 ÷ 60 (= 3.5) oe A1 cao
	(c)		not enough information	1	B1 for 'not enough information' ticked **and** appropriate explanation given
21			25	4	M1 for 600 ÷ 4 (= 150) M1 for 4500 ÷ "150" (= 30) M1 for 750 ÷ "30" A1 for 25 with supporting working **OR** M1 for 4500 ÷ 750 (= 6) M1 for 600 ÷ 4 (= 150) or 600 ÷ "6" (= 100) M1 for "150" ÷ "6" or "100" ÷ 4 A1 for 25 with supporting working **OR** M1 for 4500 ÷ 750 (= 6) or 750 ÷ 4500 (= $\frac{1}{6}$) M1 for $\frac{1}{4}\times"\frac{1}{6}"$ $\left(=\frac{1}{24}\right)$ M1 for $"\frac{1}{24}"\times 600$ A1 for 25 with supporting working

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*22			130 + correct reasons	4	M1 for angle *BFG* = 65 (may be seen on diagram) M1 (dep) for correct method to calculate *x* eg (*x* =) 65 + 65 (= 130) **or** (*x* =) 180 − (180 − 2 × 65) (= 130) C2 for *x* =130 **and** full appropriate reasons related to method shown (C1 (dep on M1) for any one appropriate reason related to method shown) eg alternate angles are equal ; base angles in an isosceles triangle are equal; angles in a triangle add up to 180°; angles on a straight line add up to 180°; exterior angle of triangle = sum of two interior opposite angles co-interior angles (allied angles) add up to 180°
23	(a)		2 reasons	2	B2 for two different reasons (B1 for 1 reason) eg No units (of distance) eg Overlapping intervals (2 and/or 3 in two boxes) eg Missing box (no box for more than 6 (km/miles) or 'other' or 4.5 (km/miles))
	(b)		Question	2	B1 for a suitable question which includes a time frame (time frame could appear with response boxes) B1 for at least 3relevant non-overlapping **and** exhaustive response boxes [Do not allow inequalities in response boxes]

PAPER: 1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
24	(a)		$e(3e + 5)$	1	B1 for $e(3e + 5)$
	(b)		4	3	M1 for intention to expand brackets eg $7k - 21$ **or** division of all terms on RHS by 7 as a first step M1 for correct method to isolate terms in k in an equation A1 cao
	(c)		$a = 2f - 1$	2	M1 for a correct first step eg intention to multiply both sides by 2 A1 cao
25			$2 \times 2 \times 3 \times 3 \times 5$	3	M1 for continual prime factorisation (at least two consecutive steps correct) **or** at least two stages of a factor tree correct M1 for a fully correct factor tree **or** list 2, 2, 3, 3, 5 A1 for $2 \times 2 \times 3 \times 3 \times 5$ or $2^2 \times 3^2 \times 5$
26			9	4	M1 for method to find the area of one rectangle eg 15×8 (=120) or 15×11 (=165) M1 (dep) for subtraction from/by given area eg 138 − "120" (=18) or "165" – 138 (=27) M1 for final step from complete method shown eg 15 − "18"÷ 3 or for "27" ÷ 3 A1 cao **OR** M1 for a correct expression for the area of one rectangle eg $(8 + 3) \times (15 - x)$ or $8 \times x$ M1 (dep) for a correct equation eg $(8 + 3) \times (15 - x) + 8 \times x = 138$ M1 for correct method to isolate x eg $3x = 27$ A1 cao

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PAPER: 1MA0_1F			
Question		**Modification**	**Notes**
1		Take out Jannu	
2	(b)	Table layout modified 2 cm grid provided with 14 squares across and 12 squares up Space on left and at the bottom for labeling	
5		Shapes H and I removed	
7		*a* changed to *e* *c* changed to *f*	
10		Spinner straightened up,● at centre to represent spike	
13		2 cm grid provided	
14		1½ cm grid provided Enlargement given Question reversed – 'Describe fully the transformation that maps Shape A onto Shape B	

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PAPER: 1MA0_1F			
Question		**Modification**	**Notes**
15		Horizontal lines inserted to separate rows	
17		Model provided	

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Mark Scheme (Results)

November 2015

Pearson Edexcel GCSE
In Mathematics B (2MB01)
Foundation (Calculator) Unit 1

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ii*) select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Partial answers shown (usually indicated in the ms by brackets) can be awarded the method mark associated with it (implied).
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5MB1F_01 November 2015					
Question		**Working**	**Answer**	**Mark**	**Notes**
1.	(a)		Black	1	B1 cao
	(b)		Fran	1	B1 cao
	(c)		Derek	1	B1 cao
2.	(i)		16	2	B1 cao
	(ii)		12		B1 cao
3.	(a)		A	1	B1 cao
	(b)		D	1	B1 cao
4.			£44.80 or 4480p	4	M1 for 8565 – 8437 (=128) M1 for "128" × 35 A1 for digits 448(0) C1 for £44.80 or 4480p ie clearly stated answer with correct money notation.

5MB1F 1F November 2015					
Question		**Working**	**Answer**	**Mark**	**Notes**
5.			Diagram or chart	4	B1 for a key or suitable labels to identify the Wizard and Reds. The key may be ignored if unclear provided the graph is clear, ie if different colours are used to shade in the graph. B1 for a diagram(s) or chart(s) set up for comparison showing data for at least 3 months eg dual bar chart, composite bar charts, frequency polygon, etc. B1 for correct heights for Wizards or Reds or totals C1 for a fully correct diagram or chart.
6.		(S,F), (S,M), (S,P) (J,F), (J,M), (J,P)	6 choices	2	B2 for all 6 choices with no extras or repeats (B1 for at least 3 correct; ignore extras or repeats)
7.	(a)		$\frac{3}{10}$	2	M1 for $\frac{a}{10}$ or $\frac{3}{b}$ where $a < 10$ and $b > 3$ A1 for $\frac{3}{10}$ oe
	(b)		$\frac{7}{10}$	1	B1 ft or for $\frac{7}{10}$ oe

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5MB1F 1F November 2015					
Question		**Working**	**Answer**	**Mark**	**Notes**
8.	(a)		3	2	M1 for evidence of ordering A1 cao
	(b)		4	2	M1 for 6 – 2 A1 cao
	(c)		3.5	2	M1 for (3 + 6 + 2 + 2 + 5 + 3) ÷ 6 or 21 ÷ 6 A1 cao
9.			Data collection sheet	3	B1 for data illustrated for fruit (at least 3 items) or correct heading B1 for tally column or frequency column labelled B1 for suitable data collection sheet appropriate to the task e.g. with exactly 3 columns and which are all correctly labelled NB do not accept questionnaires or graphs

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5MB1F 1F November 2015					
Question		**Working**	**Answer**	**Mark**	**Notes**
10.			67	2	M1 for at least three of 1 × 8, 2 × 6, 3 × 7, 4 × 4, 5 × 2 or at least three of 8, 12, 21, 16, 10 A1 cao
11.	(a)		15.86	4	M1 for 4 × 96 (= 384) or 3 × 56 (= 168) M1 for (“384” + ”168”) × 3 ÷ 4 oe or sight of 414 M1 for 20 – “4.14” or 1586 A1 cao **OR** M1 for 4 × 96 (= 384) or 3 × 56 (= 168) M1 for 20 – (“384” + ”168”) or 20 – “552” (= 1448) M1 for “1448” + (“552” ÷ 4) A1 cao NB allow work in £ or p for M marks
	(b)		7	2	M1 for 14 ÷ 1.84 or 7.60(8695…) or 12.88 and 14.72 A1 cao
12.	(a)		20 – *t*	1	B1 for 20 – *t*
	(b)		4*x* + 20*y*	2	B2 for 4*x* + 20*y* (B1 for 4*x* or 20*y*)

5MB1F 1F November 2015					
Question		**Working**	**Answer**	**Mark**	**Notes**
13.	(a)		20	2	M1 for $\frac{60}{360}\times 120$ A1 cao **OR** M1 for 360 ÷ 120 (= 3) or 60 ÷ 3 A1 cao
	(b)		50	3	M1 for 360 – (45 + 60 + 105) (= 150; could be measured) M1 for 360 ÷ 120 (= 3°) or "150" ÷ 3 A1 for 50; allow answers in the range 49-51 **OR** M1 for 360 – (45 + 60 + 105) (= 150; could be measured) M1 for $\frac{"150"}{360}\times 120$ A1 for 50; allow answers in the range 49-51 **OR** M1 for 360 – (45 + 60 + 105) (= 150; could be measured) M1 for $\frac{"150"}{60}\times "20"$ A1 for 50; allow answers in the range 49-51 **OR** M1 for working out how many in all three sectors M1 for subtraction from 120 A1 for 50; allow answers in the range 49 - 51

5MB1F 1F November 2015					
Question		**Working**	**Answer**	**Mark**	**Notes**
14.	(a)		(146, 41)	1	B1 point plotted
	(b)		Description	1	B1 for description of dynamic relationship or statement of positive correlation
	(c)		155 – 158	2	M1 for a single straight line segment with positive gradient that could be used as a line of best fit or a horizontal line from 47.5 A1 answer in the range 155 – 158 or ft from line
15.	(a)		Out: 1023/1148 Return: 1737/1918 in Colwyn 5h 49min	4	B1 for selecting 1023 train (cheapest out) B1 for selecting 1737 B1 for 5h 49min (spent in Colwyn) C1 (dep on at least B1) clearly stating departure and arrival times of both trains used and correct time in Colwyn for their trains
	(b)		133.40	3	M1 for 30% of any adult fare M1 for 2 × adult fare + 3 × child fare for at least one of their chosen trains A1 (accept 133.4) (SC B2 for £188.60)

5MB1F 1F November 2015

Question	Working	Answer	Mark	Notes
16.	<table><tr><td></td><td>Bus</td><td>Pre</td><td>Ec</td><td>Tot</td></tr><tr><td>M</td><td>(30)</td><td>28</td><td>34</td><td>(92</td></tr><tr><td>F</td><td>14</td><td>32</td><td>(62)</td><td>108</td></tr><tr><td>Total</td><td>(44)</td><td>(60)</td><td>96</td><td>(200</td></tr></table> ( ) value given	28	4	M1 for total female passengers 200 – 92 or 108 seen; or for total Economy passengers 200 – 44 – 60 or 96 seen. M1 for male passengers in Economy “96” – 62 or 34 seen; or for female Premium “108” – 62 – (44 – 30) or 32 seen M1 for 92 – 30 – “34” or for 60 – “32” A1 cao **OR** Answers may appear in a two-way table with no other method seen B1 for Female total 108 or Total Economy 96 M1 for “96” – 62 or 34 seen in Male Economy; or “108” – 62 – (44 – 30) or 32 seen in Female Premium M1 for 92 – 30 – “34” or for 60 – “32” A1 cao

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PAPER: 5MB1F_01			
Question		**Modification**	**Notes**
Q01		Row for Gary removed.	
Q02		Diagram enlarged.	
Q03		Crosses changed to filled in circles. Diagram enlarged.	
Q05		Value on table changed: Wizard: 20 28 18 32. Reds not altered. Grid enlarged.	
Q10		Frequency column widened to allow for working.	
Q13		Diagram enlarged.	
Q14	(a)	Grid enlarged. Crosses changed to filled in circles. 146 cm changed to 150 cm. 41 kg changed to 40 kg.	
Q15		Crewe to Colwyn – First 2 columns removed. Colwyn to Crewe – First and last columns removed	

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Mark Scheme (Results)

Summer 2016

Pearson Edexcel GCSE
In Mathematic A (1MA0)
Foundation (Non-Calculator) Paper 1F

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Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect cancelling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.
Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations
Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

12 Parts of questions
Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers
Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

PAPER: 1MA0/1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		February	1	B1 cao
	(b)		Onions	1	B1 cao
	(c)		Lettuces	1	B1 cao
2	(a)		0.5	1	B1 cao
	(b)		$\frac{3}{10}$	1	B1 for $\frac{3}{10}$ or equivalent fraction
	(c)		80	1	B1 cao
	(d)		57.6	1	B1 cao
	(e)		$\frac{1}{3}$	2	M1 for writing over a single denominator eg $\frac{7-3}{12}$ or for $\frac{4}{12}$ A1 cao
3	(a)		A, D	1	B1 cao
	(b)		B	1	B1 cao

PAPER: 1MA0/1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*4	(a)		Statement (supported)	3	M1 for method to find total visitors for 2009 or for 2010 eg 185+108+133+231+124 (=781) or 177+120+128+230+118 (=773) A1 for 781 **and** 773 (or 781000 **and** 773000) C1 ft (dep on M1 and two totals) for clearly stating 2009 as their answer or ft from their two totals. OR M1 for method to find difference in the number of visitors for each castle eg 8, −12, 5, 1, 6 or −8, 12, −5, −1, −6 A1 for correct total net difference 8 or −8 C1 (dep M1 and a net difference) for clearly stating 2009 as their answer or ft from their net difference.
	(b)(i)		09 36	2	B1
	(ii)		54		B1 cao
	(c)		09 21	1	B1
5	(a)		unlikely	1	B1 cao
	(b)		cross at $\frac{1}{2}$	1	B1 for cross at $\frac{1}{2}$
	(c)		cross at O	1	B1 for cross at O

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PAPER: 1MA0/1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
6	(a)		30	3	M1 for 21 × 6 (= 126) or 32 × 6 ÷ 2 (=96) M1 for 21 × 6 – (32 × 6 ÷ 2) A1 cao OR M1 for 21 × 2 – 32 (= 10) M1 (21 × 2 – 32) × 6 ÷ 2 A1 cao
	(b)	(C, F) (C, E) (C, T) (L, F) (L, E) (L, T)	list of 6 pairs	2	B2 for six correct and distinct pairs with no repeats (B1 for at least 3 correct pairs and no incorrect pairs)
7	(a)		parallelogram	1	B1 cao
	(b)		Sketch of cuboid	1	B1 for sketch of cuboid
8	(a)		15	1	B1 cao
	(b)		6	1	B1 cao
	(c)		3	2	M1 for intention to subtract 7 from both sides or divide all terms by 2 as a first step A1 cao
*9			1 cm^2	3	M1 for method to find the area of A or area of B eg for A 6 + 3 (=9), 12 – 3 (=9) eg for B 4 + 4 (=8), 12 – 4 (=8) A1 for 9 and 8 C1 (dep M1) for 1cm^2 or ft from their 2 areas

PAPER: 1MA0/1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
10	(a)		6	1	B1 cao
	(b)		44	1	B1 cao
	(c)		33, 11, 4 or 4, 11, 33 or 8, 4, 6 or 6, 4, 8	1	B1 cao
11	(a)		24	3	M1 for 4×10 (= 40) M1 for operations –"40" then ÷ 7 in correct order or 20 A1 cao
	(b)		$35e$	2	M1 for $7 \times e$ or $5 \times e$ or $7 \times 5 \times e$ oe A1 for $35e$ (ignore £ signs)
12			40 m*l* or 0.04 *l*	3	M1 for 12×330 (= 3960) M1 for $4 \times 1000 - (12 \times 330)$ (= 40) A1 for 40 m*l* OR M1 for $12 \times \frac{330}{1000}$ (= 3.96) or digits 396 M1 for $4 - (12 \times \frac{330}{1000})$ (= 0.04) A1 0.04 *l*

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PAPER: 1MA0/1F					
Question		Working	Answer	Mark	Notes
13	(a)		42	5	M1 for 300 × 3 (= 900) or 150 ÷ 3 (= 50) M1 (dep) for "900" ÷ 150 (= 6 jars) or 300 ÷ "50" (= 6 jars) M1 for 500 ÷ 160 (= 4 boxes) M1 for "6" × 4.00 (=24) + "4" × 4.50 (18) A1 cao
	(b)		168	3	M1 for 6 × 30 M1 (dep) for "180" – 12 A1 cao

PAPER: 1MA0/1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*14	(a)		4.5	1	B1 cao
	(b)		Comparison (supported)	3	M1 for correct use of graph to convert 0°F into °C A1 for –17.5 to –18 C1 (dep M1) for correct comparison of relative temperatures with units correct. eg freezer is warmer with –18°C or ft using their converted temperature with correct units. OR M1 for correct use of graph to convert −10°C into °F A1 for 14 C1 (dep M1) for correct comparison of relative temperatures with units correct. eg freezer is warmer with 14°F or ft using their converted temperature with correct units.
15			Data collection sheet	3	B1 for a fruit type column. B1 for tally column. B1 for frequency column.
16	(a)		30	1	B1 cao
	(b)		120	2	M1 for $\frac{15}{100} \times 800$ oe A1 cao

PAPER: 1MA0/1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
17	(a)		3 (5) 7 (9) 11, 13	2	B2 for 3, 7, 11, 13 (B1 for 2 or 3 correct values)
	(b)		Graph drawn	2	M1 (may ft from (a) if B1 awarded) for at least 5 points correctly plotted A1 for correct graph from $x = 0$ to $x = 5$
18	(a)		$\frac{120}{360}$	2	M1 for 360 – 45 – 105 – 90 (= 120) oe A1 for $\frac{120}{360}$ oe OR M1 for measuring angle as 118 – 122 A1 ft for $\frac{"120"}{360}$ oe
	(b)		18000	2	M1 for 4500 × 4 oe A1 cao

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PAPER: 1MA0/1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
19	(a)(i)		12	2	B1 cao
	(ii)		8		B1 cao
	(b)		Sketch of net	2	M1 for attempt to draw net with 2 of the following 3 features: 6 rectangles 2 polygon faces with at least 5 edges a net with correct connections to give at least one vertex with 3 faces meeting. A1 for a correct net
	c)		750 cm^3	3	M1 for 30×25 A1 for 750 B1 (indep) for cm^3
20	(a)		p^7	1	B1 cao
	(b)		$-5m + 10$	2	M1 for $3m + 12$ or $-8m - 2$ or $8m + 2$ A1 for $-5m + 10$ or $10 - 5m$ or $-5(m - 2)$ or $5(2 - m)$
	(c)		$n(n - 7)$	1	B1 cao

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PAPER: 1MA0/1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
21	(a)		250	2	M1 for $400 \div 8$ or $\frac{5}{8}$ oe A1 cao
	(b)		60	3	M1 for $\frac{16}{80}$ or $\frac{300}{80}$ oe M1 (dep) for "$\frac{16}{80}$" $\times 300$ or "$\frac{300}{80}$" $\times 16$ A1 cao
22	(a)		Correct shape	2	B2 for correct reflection with vertices (–4, 2) (–6, 3) (–6, 7) (–4, 6) (B1 for reflection in a vertical or horizontal line)
	(b)		Correct shape	2	B2 for correct rotation with vertices (–1, 3) (–5, 3) (–6, 5) (–2, 5) (B1 for rotation of 90° clockwise about (0,1) **or** correct orientation fully in correct quadrant)
23	(a)		Reasons	2	B2 for 2 reasons from: no time frame, vague response boxes, not exhaustive eg "always" (B1 for 1 reason)
	(b)		Question written	2	B1 for a suitable question which includes a time frame (the time frame could appear with the response boxes) B1 for at least 3 non-overlapping exhaustive response boxes with no use of inequality symbols

PAPER: 1MA0/1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*24			Conclusion (supported)	5	M1 for finding the area of one rectangle which is not 6 × 10 eg 2×2.5 (=5) or 4×10 (=40) or 2.5 × 6 or 5 × 2 M1 for a complete method to find the total area eg 5+5+40 or 60−10 (=50) M1 for a complete method to find the number of tins needed eg "50" ÷ 5 ÷ 2.5 (=4) OR for a complete method to find the number of litres needed. eg "50" ÷ 5 (=10) OR for a complete method to find the area covered by 3 tins eg 3×2.5×5 (=37.5) A1 for 50 (m^2) **and** (4 tins needed) **or** for 10 (litres) **and** 7.5 (litres) **or** for 50(m^2) **and** 37.5(m^2) C1 (dep M2) for a conclusion supported by their calculations

Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5°
Measurements of length: ±5 mm

PAPER: 1MA0_1F			
Question		**Modification**	**Notes**
1		3rd row in table for beans removed	Standard mark scheme
3	(a)	Background grid has been removed. Labels added above the shapes. MLP only: Shape B and D exchanged.	B1 for A, B
3	(b)	Background grid has been removed. Labels added above the shapes. MLP only: Shape B and D exchanged.	B1 for D cao
4	(b)	Braille only: Coombe Florey row removed.	B1 cao
5		Diagram enlarged.	Standard mark scheme
	(b)	Probability scale enlarged. The wording 'with a cross (x)' has been removed.	Standard mark scheme
	(c)	Probability scale enlarged. The wording 'with a cross (x)' has been removed	Standard mark scheme
7	(a)	Diagram enlarged	Standard mark scheme
	(b)	Model of a cuboid provided for all candidates. Diagram enlarged and also provided for MLP. Wording changed 'Name the solid shape shown.' Answer line added	B1 for cuboid

PAPER: 1MA0_1F			
Question		**Modification**	**Notes**
9		Grid enlarged. Shading changed to dotty shading. Label added above the shapes. 'centimetre grid' replaced by'grid of squares'. Wording added 'Each square on the grid represents a one centimetre square.'	Standard mark scheme
13	(a)	Diagrams removed.	Standard mark scheme
	(b)	Diagrams removed.	Standard mark scheme
14		Grid enlarged. Small squares removed.	Standard mark scheme
17	(a)	Wording added above the table 'There are four spaces to fill.'	Standard mark scheme
	(b)	Grid enlarged. Right axis labelled.	Standard mark scheme
18	(a)	Diagram enlarged.	Standard mark scheme
	(b)	Diagram enlarged.	Standard mark scheme
19	(a)	Model provided for all candidates. Diagram enlarged and also provided for MLP	Standard mark scheme
	(b)	Question changed: 4 nets drawn A, B, C and D. Wording removed 'In the space below, sketch a net of the prism.' Wording added 'Which shape A, B, C or D shows the net of the prism.'	B2 for B cao
	(c)	Model provided for all candidates. Diagram enlarged and also provided for MLP.	Standard mark scheme
21		Diagram enlarged. Dot added to the centre. Arrow head changed to an open headed arrow. Left side of arrow removed.	Standard mark scheme

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PAPER: 1MA0_1F			
Question		**Modification**	**Notes**
22	(a)	Reflection drawn on the diagram. Shading changed to dotty shading. Wording changed 'It shows shape P and shape Q given on a grid. Describe fully the transformation that maps shape P onto shape Q.' Grid enlarged. y axis is cut at -4. 3 answer lines given.	B1 for reflection B1 for x = – 1
	(b)	Rotation drawn on the diagram. Wording changed 'It shows shape P and shape S given on a grid. Describe fully the single transformation that maps shape P onto shape S.' 3 answer lines given.	B2 for all three of: Rotation 90° anti-clockwise Centre (0, 1) (B1 for two)
24		Diagram enlarged. Braille only: Plan of floor labelled ABCDEFGH as 1F Q24.	Standard mark scheme

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Mark Scheme (Results)

Summer 2016

Pearson Edexcel GCSE
In Mathematics A (1MA0)
Foundation (Calculator) Paper 2F

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Note that in some cases a correct answer alone will not score marks unless supported by working; these situations are made clear in the mark scheme. Examiners should be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will award marks for the quality of written communication (QWC).
The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labelling conventions.

ii*) select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Partial answers shown (usually indicated in the ms by brackets) can be awarded the method mark associated with it (implied).
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks; transcription errors may also gain some credit. Send any such responses to review for the Team Leader to consider.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect cancelling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded (embedded answers).

12 Parts of questions

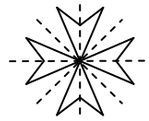
Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

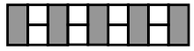
14 The detailed notes in the mark scheme, and in practice/training material for examiners, should be taken as precedents over the above notes.

Guidance on the use of codes within this mark scheme
M1 – method mark for appropriate method in the context of the question A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		4726 in words	1	B1 accept 4 thousand 7 hundred and twenty six
	(b)		5 000 000	1	B1 cao
	(c)		3600	1	B1 cao
	(d)	7.04, 7.47, 7.58, 7.6 7.69	ordered	1	B1 cao
2	(a)		8	1	B1 cao
	(b)		Tuesday, Thursday	2	M1 for method to find total number of apples sold eg 4 + 6 + 8 + 9 + 3 (=30) A1 cao
3	(a)		2	1	B1 cao
	(b)			2	M1 for any 2 correct lines of symmetry, allow extras A1 for all 4 lines and no extras

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
4		30×8p + 40×4p = 400p 30×3p + 40×2p = 170p 400 – 170 = 230 OR (8 – 3) × 30 = 150p (4 – 2) × 40 = 80p 150 + 80 = 230	2.30	3	M1 for a complete method to find the cost for one company M1 for a complete method to find the cost for both companies and finding the difference A1 cao OR M1 for a complete method to find the differences in cost for calls or texts M1 for a complete method to find the amount saved and finding the sum A1 cao **SC:** B2 for an answer with digits 23
5	(a)		$\frac{7}{10}$	1	B1 cao
	(b)		12 squares shaded	1	B1 for 12 squares shaded
	(c)		64	3	M1 for 80 ÷ 5 (= 16) M1 (dep) for 80 – "16" or "16" × 4 A1 cao OR M1 for $1 - \frac{1}{5}$ $(=\frac{4}{5})$ M1 (dep) for "$\frac{4}{5}$"× 80 A1 cao

PAPER: 1MA0_2F					
Question		Working	Answer	Mark	Notes
6	(a)		35	1	B1 cao
	(b)		30	1	B1 cao
	(c)		50	2	M1 for 35 – 10 (= 25) or 40 – 15 (= 25) or 35 + "30" – 15 oe A1 for 50 or f.t. from (b) + 20
7	(a)		24	3	M1 for using 1 kg = 1000 g M1 for dividing "5.4kg" by 450g or 10 × 450 + 900 = 5400 or 10 + 2 = 12 oe A1 cao NB: Candidates can work in kg and/or g
	*(b)		No and explanation	4	M1 for a correct first step eg 90 + 30 (= 120) eg 5.4 × 20 (= 108 or 1h 48 m) M1(dep) for a complete method to get 6 18 pm or 2 12 pm or 228 or 3h 48m A1 for 6 18 pm or 2 12 pm or 228 **and** 210 or 18 or 3h 48m **and** 3h 30m C1 ft (dep on M2) for correct decision based on their figures
8	(a)		1, 5	1	B1 cao
	(b)		Point D marked	1	B1 cao
9	(a)		2.7	1	B1 cao
	(b)		9261	1	B1 cao

PAPER: 1MA0_2F					
Question		Working	Answer	Mark	Notes
10	(a)		19	1	B1 cao
	(b)		21.5	2	M1 for evidence of adding all 10 numbers and dividing by 10 eg (20+14+21+19+27+31+19+19+24+21)÷10 or 215 ÷10 or $x \div 10$ seen where $205 \leq x \leq 225$ A1 cao
	(c)		96	3	M1 for 320×2.4 (= 768) or for $1000 \div 2.4$ (= 416.6 or 416) M1 for $(1000 - 320 \times 2.4) \div 2.4$ or for $1000 \div 2.4 - 320$ or an answer of 96.6(66....) or 96.7 or 97 A1 cao
11	(a)		drawing	1	B1 cao
	(b)		9	1	B1 cao
	(c)		Yes (supported)	1	C1 for Yes with reason eg "the number of squares is always even (and 50 is even)" oe
	(d)		38	1	B1 cao
12	(a)		$\frac{1}{6}$	1	B1 for $\frac{1}{6}$ oe
	(b)		1	1	B1 cao

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PAPER: 1MA0_2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
13 (a)		1270 or 1320	2	M1 for adding the six lengths or an answer of digits 127(0) or digits 132(0) A1 for 1270 or 1320
(b)		32 mm or 3.2 cm	1	B1 for answer in range 30 mm to 34 mm or in range 3 cm to 3.4 cm
(c)		Drawing	3	M1 for at least one right angle M1 for 10cm line or 12.5cm line A1 for fully correct drawing
14 (a)		$5m$	1	B1 cao
(b)		$4pr$	1	B1 cao
(c)		$7x + 3y$	2	B2 for $7x + 3y$ oe (B1 for $7x$ or $3y$ seen)
15		21	2	M1 for $ACD = 180 - 90 - 58$ oe (= 32) or for $CDB = 180 - 58$ (= 122) or for $x = 58 - 37$ A1 cao

PAPER: 1MA0_2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
*16		Bag A (supported)	3	M1 for $\frac{3}{7}$ or $\frac{5}{12}$ M1 (dep) for method to compare the two probabilities, e.g using a common denominator, eg $\frac{3}{7}=\frac{36}{84}$; $\frac{5}{12}=\frac{35}{84}$ or writing as decimals eg $\frac{3}{7}=0.428571...$ and $\frac{5}{12}=0.416666...$ C1 (dep on M2) for Bag A and correct method of comparison with correct figures using $\frac{3}{7}$ and $\frac{5}{12}$
17	**34** 44 78 42 **28** 70 76 **72** **148**	Complete table	3	B3 all correct (B2 for 5, 6, 7 or 8 correct) (B1 for any 2 of the 4 given correctly placed)
18		drawing	2	M1 for (quadrilateral with) at least 2 correct sides A1 cao

PAPER: 1MA0_2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
19 (a)		45	2	M1 for 60 + 60 + 60 oe (= 180) or 0.75 × 60 oe A1 cao
(b)		48	3	M1 for 120 ÷ 30 (= 4) or 720 ÷ 60 (= 12) M1 (dep) for "4" × "12" A1 cao OR M1 for 120 ÷ 60 (= 2) or 720 ÷ 30 (= 24) M1 (dep) for "2" × "24" A1 cao OR M1 for 720 × 120(= 86400) or 60 × 30 (= 1800) M1 (dep) for "86400" ÷ "1800" A1 cao
20 (a)		32.5	2	M1 for median value is 10.5th evidenced by 10th and 11th seen or "31, 34" written or (31 + 34) ÷ 2 (condone missing brackets) or both 31 and 34 identified in the stem and leaf diagram or in a fully ordered list A1 for 32.5 (accept $32\frac{1}{2}$)
(b)		32	2	M1 for 47 – 15 or 15 – 47 A1 cao
(c)		7	1	B1 cao

PAPER: 1MA0_2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
21		9.25	3	M2 for $x + x + 4 + x + x + 4 = 45$ oe or $x + x + 4 = 22.5$ oe (M1 for $x + x + 4 + x + x + 4$ oe) A1 for 9.25 or $\frac{37}{4}$ oe OR M1 for $45 - 8$ (= 37) or $22.5 - 4$ (= 18.5) M1 for $(45 - 8) \div 4$ or $(22.5 - 4) \div 2$ A1 for 9.25 or $\frac{37}{4}$ oe
*22	400 ÷ 18 = 22(.2) 499 ÷ 20 = 24(.95) or 25 600 ÷ 26 = 23(.07…) (or equivalent in £) 18 ÷ 4 = 4.5 20 ÷ 4.99 = 4(.008…) 26 ÷ 6 = 4.3(333…)	18 pack (supported)	4	M1 for a method that would result in at least two values that could be used to compare two packs M1 for a method that would result in values that could be used to compare all three packs A1 for all fully correct figures suitable for comparison C1 ft (dep on M2) for comparison of their values with a correct conclusion from their figures

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PAPER: 1MA0_2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
23 (a)		20.3	2	M1 for $\frac{50}{1.57^2}$ oe A1 for answer in range 20.2 to 20.3
(b)		68.04	2	M1 for (m =) $1.8^2 \times 21$ oe A1 cao
(c)		2.61	3	M2 for a complete method to find 145% of 1.8, eg. $\frac{145}{100} \times 1.80$ oe (M1 for a method to find 45% of 1.8, eg. $\frac{45}{100} \times 1.80$ (= 0.81) or for a multiplication factor of 1.45) A1 cao
24		Polygon drawn	2	B2 for correct frequency polygon (B1 for points plotted at correct midpoints of intervals or joining points at correct heights consistently within intervals including plotting at end values or correct frequency polygon with one point incorrect or correct frequency polygon with first and last points joined directly) NB ignore any histogram drawn and any part of frequency polygon outside range of first and last points plotted

PAPER: 1MA0_2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
*25		124° with reasons	4	M1 for a method to find any angle eg. angle *DEF* = 180 – 70 – 54 (= 56) or angle *AEB* = 70 or angle *EAB* = 54 or angle GEB = 180 – 70 (= 110) A1 for *x* =124 NB: Angles may be shown on the diagram C2 for full reasons, appropriate to their given method, with no additional reasons (C1 for one appropriate reason relating to parallel lines) Possible reasons: corresponding angles are equal; alternate angles are equal co-interior (allied)angles add up to 180; angles on a straight line add up to 180; angles in a triangle add up to 180 vertically opposite angles are equal; the exterior angle of a triangle is equal to the sum of the interior opposite angles; angles at a point add up to 360;

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PAPER: 1MA0_2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
26		42.28	5	M1 for method to find weekly mileage eg. 18 × 2 × 5 (= 180) or weekly car park charge, eg. 3.50 × 5 (= 17.50) M1 for method to find fuel used in a relevant journey eg. 180 ÷ 45.2 (= 3.9823 gallons) or 18 ÷ 45.2 (= 0.39823 gallons) M1 for a correct use of the conversion factor to convert between gallons and litres eg. "3.9823"× 4.546 (= 18.1 … litres) or "0.39823" × 4.546 (= 1.81 …. litres) or 1.369 × 4.546 (= 6.22...£/gallon) or 45.2 ÷ 4.546 (= 9.942 miles/litre) M1 for a method to find the cost of a relevant journey eg. "18.1…" × 1.369 (= 24.78 …) or "1.81…" × 1.369 (= 2.478 …) or "3.9823" × "6.22.." (= 24.78...) A1 for answer in the range 42.26 to 42.3(0) NB candidates could work in litres or in gallons and/or could work in £ or p

Table for use in Question 26

Journeys in miles	Fuel used in gallons; miles ÷ 45.2	Fuel used in litres, gallons × 4.546	Cost of journey in £, litres × 1.369 or gallons × 6.22...
18	0.398...	1.81...	2.478...
36	0.796...	3.62...	4.956...
90	1.991...	9.05...	12.39...
180	3.98...	18.1...	24.78...
252	5.57...	25.3...	34.69...

Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5°
Measurements of length: ±5 mm

PAPER: 1MA0_2F			
Question		**Modification**	**Notes**
2		Diagram enlarged. Shading changed to dotty shading	Standard mark scheme
3	(a)	Diagram enlarged.	Standard mark scheme
	(b)	Diagram enlarged. Four shapes changed to convex kites	
5	(a)	Grid enlarged. Shading changed to dotty shading.	Standard mark scheme
	(b)	Grid enlarged	
6		Grid enlarged. Small squares removed.	Standard mark scheme
8		Grid enlarged. Crosses changed to filled in circles. Arrows changed to open headed arrows.	Standard mark scheme
11		The 3 patterns are placed vertically. Pattern number 3 is repeated below and labelled 'pattern number 4 (not completed).' Wording changed 'Pattern number 4 has been started below pattern number 3. Complete pattern number 4 on the diagram.' Wording 'grey' changed to 'shaded'. Grey shading changed to dotty shading.	Standard mark scheme

PAPER: 1MA0_2F			
Question		**Modification**	**Notes**
12		Diagram enlarged and straightened up. Spike removed and replaced with a filled in circle at the centre.	Standard mark scheme
13	(a) (b) (c)	Model provided for all candidates. Diagram enlarged and also provided for MLP. Diagrams placed on one page under each other. Diagram enlarged to 5 cm diameter. Diagram enlarged. *AB* line is 7.5 cm and placed under the sketch of the nest box. Braille only: Dimensions of diagram given in text.	Standard mark scheme
14	(c)	MLP only - *x* changed to *e*. *y* changed to *f*.	Standard mark scheme
15		Diagram enlarged. Wording added 'Angle *ADC* = 58°. Angle *ABC* = 37°. Angle *DCB* is marked *x*.'	Standard mark scheme
16		Diagram removed. Wording added 'There are two bags, labelled bag **A** and bag **B**. In bag **A** there are 3 black balls and 4 white balls. In bag **B** there are 5 black balls and 7 white balls.'	Standard mark scheme

PAPER: 1MA0_2F			
Question		**Modification**	**Notes**
17		Wording added 'There are nine spaces to fill.' Braille only: Two way table – Roman numerals put into spaces. (iii) (vi) (viii) (vii) (iv) (ix) (v) (ii) (i)	Standard mark scheme
18		Question changed. Two shapes are given on the grid, labelled shape P and shape Q. Question text has been changed to 'It shows shape P and shape Q on a grid. Describe fully the single transformation that maps shape P onto shape Q.'	Mark scheme changed to: B1 for enlargement B1 (indep) for scale factor 2
19	(a)	Diagrams labelled 'Diagram (i)' and 'Diagram (ii)'. Candidates are also referred to the diagram through the text. Diagrams enlarged. Wording added 'They show Diagram (i) and Diagram (ii).	Standard mark scheme
	(b)	Diagrams enlarged and placed on the same page one under each other. Wording added 'They show Diagram (iii) and Diagram (iv).' Candidates are also referred to the diagram through the text. Diagrams labelled 'Diagram (iii) and Diagram (iv).'	Standard mark scheme
20		Diagram enlarged. Base line added below '4'.	Standard mark scheme

PAPER: 1MA0_2F			
Question		**Modification**	**Notes**
21		Diagram enlarged. MLP only – x changed to y.	Standard mark scheme
22		Diagram removed. Information given in the text.	Standard mark scheme
24		The frequency values in the table have been changed to 10, 20, 10, 5 and 5. Grid enlarged. Right axis labelled.	Standard mark scheme
25		Diagram enlarged. Wording added 'Angle *FBC* is marked *x*.'	Standard mark scheme

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Mark Scheme (Results)

Summer 2017

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Foundation (Calculator) Paper 2F



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General marking guidance

These notes offer general guidance, but the specific notes for examiners appertaining to individual questions take precedence.

1 All candidates must receive the same treatment. Examiners must mark the last candidate in exactly the same way as they mark the first.

Where some judgement is required, mark schemes will provide the principles by which marks will be awarded; exemplification/indicative content will not be exhaustive. When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the response should be sent to review.

2 All the marks on the mark scheme are designed to be awarded; mark schemes should be applied positively. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme. If there is a wrong answer (or no answer) indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

Questions where working is not required: In general, the correct answer should be given full marks.
Questions that specifically require working: In general, candidates who do not show working on this type of question will get no marks – full details will be given in the mark scheme for each individual question.

3 **Crossed out work**
This should be marked **unless** the candidate has replaced it with an alternative response.

4 **Choice of method**
If there is a choice of methods shown, mark the method that leads to the answer given on the answer line.

If no answer appears on the answer line, mark both methods **then award the lower number of marks.**

5 **Incorrect method**
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review for your Team Leader to check.

6 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working as you can check the answer, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

7 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question or its context. (e.g.. an incorrectly cancelled fraction when the unsimplified fraction would gain full marks).

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect (e.g.. incorrect algebraic simplification).

8 Probability

Probability answers must be given as a fraction, percentage or decimal. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

9 Linear equations

Unless indicated otherwise in the mark scheme, full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously identified in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded (embedded answers).

10 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g. 3.5 – 4.2) then this is inclusive of the end points (e.g. 3.5, 4.2) and all numbers within the range.

Guidance on the use of abbreviations within this mark scheme	
M	method mark awarded for a correct method or partial method
P	process mark awarded for a correct process as part of a problem solving question
A	accuracy mark (awarded after a correct method or process; if no method or process is seen then full marks for the question are implied but see individual mark schemes for more details)
C	communication mark
B	unconditional accuracy mark (no method needed)
oe	or equivalent
cao	correct answer only
ft	follow through (when appropriate as per mark scheme)
sc	special case
dep	dependent (on a previous mark)
indep	independent
awrt	answer which rounds to
isw	ignore subsequent working

Paper 1MA1: 2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
1 (a)		$3p$	B1	cao
(b)		$2m^3$	B1	cao
(c)		$10 - 4c + 6d$	M1	for $-4c$ or $6d$ (accept $+-4c$)
			A1	for $10 - 4c + 6d$
2		60	B1	cao
3 (a)		Walk	B1	cao
(b)		7 on chart	B1	for bar of height 7 drawn for girls walking
(c)		4	B1	cao
(d)		96	M1	for method to find number of Year 6 students in the survey e.g. $5 + 9 + 6 + 4 + 9 + 7 + 4 + 1 + 2 + 1$ (= 48) or $14 + 10 + 16 + 5 + 3$ (= 48)
			A1	for 96 or ft from (b), eg 82 if no bar in (b)
4		$\frac{11}{30}, \frac{2}{5}, \frac{7}{15}, \frac{1}{2}$	M1	converts fractions to a common form, e.g. fractions with a denominator of 30, decimals or percentages, at least two conversions correct or any 3 fractions in correct order
			A1	correct order

Paper 1MA1: 2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
5 (a)		Monday wrong	C1	for seeing difference in tally marks and frequency for Monday
(b)		Comment	C1	for suitable comment, eg extra picture for Tuesday needed or explains that 0.5 of a CD is not possible
6		268.20	P1	for a process to work out the value of the £1 coins, eg. 495 ÷ 3 (= 165) or 495 × 0.33...or of the 50p coins, eg. 124 ÷ 2 (= 62)
			P1	for process to find the number of 20p coins, eg. (495 – 124 – (“165”) (= 206)
			P1	for complete process to find total value using consistent units., eg. (“165”) + (124 ÷ 2) + (“206” × 0.2) or 165 + 62 + 41.2
			A1	cao (accept 268.2)
7		0.985	B1	oe
8 (a)		25	B1	for 25 (accept 5^2)
(b)		24	B1	cao
(c)		23, 29	B1	for 23 and 29 and no extras
9		54	M1	for method to form equation, eg 90 + 2x + 3x = 360 or for 360 – 90 (= 270)
			M1	for 5x = 360 – 90 or for 2x + 3x = 360 – 90 or for 2x = 108 or for 3x = 162 or for 270 ÷ 5
			A1	cao

Paper 1MA1: 2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
10		Letters2send (supported)	P1	for the start of a process to find comparable costs at either shop, e.g. 150 ÷ 25 (= 6) or 150 ÷ 30 (= 5), 150 ÷ 10 (= 15), 2.10 ÷ 15 = (=0.14)
			P1	for process to find cost from Letters2send, e.g. (150 ÷ 25) × 3.49 (= 20.94)
			P1	for process to find cost at Stationery World, e.g. (150 ÷ 30) × 2 × 2.10 (= 21)
			C1	for correct conclusion with correct values from each shop (20.94 and 21)
				OR
			P1	for the start of a process to find comparable costs, eg 3.49 ÷ 25 (= 0.1396), 2.10 ÷ 10 (= 0.21), 25 ÷ 3.49 = (7.1...), 2.10 ÷ 15 = (= 0.14)
			P1	for process to take into account the offer at Stationery World, eg buy 30 envelopes pay for 20,
			P1	for complete process to find values that can be used for comparison, eg 30 × 0.13(96) and 2 × 2.10 (= 4.2(0))
			C1	for correct conclusion with correct values from each shop (4.1(88) and 4.2(0))

Paper 1MA1: 2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
11 (a)		29	B1	answer in the range 29 to 30
(b)		186 to 195	M1	for changing 6ft 3 inches to inches e.g. $6 \times 12 + 3$ (= 75) or changing 1ft to 30 cm
			M1	for a method to convert to cm, e.g. 25 →63 then × 3, $6 \times 30 + \frac{1}{4} \times 30$
			A1	for answer in the range 186 to 195 or ft from correct use of graph
12		0.0733(03...)	M1 A1	for correct numerator (3.4496.....) or correct denominator (47.0596) or 0.073 for 0.0733(03.....)
13 (a)		Rotation	B2	for a fully correct rotation at (–4,–1), (–3,–1), (–4,–4), (–1,–2)
			[B1	for the quadrilateral in correct orientation and size or rotated 90° anticlockwise about the origin]
(b)		Reflection in the *y*-axis	B1	for reflection
			B1	for *y*-axis (or *x* =0)
				[A combination of transformations scores 0 marks]

Paper 1MA1: 2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
14 (a)		$5(1 - 2m)$	B1	cao
(b)		$2ab(a + 3b)$	M1	for $2a(ab + 3b^2)$ or $2b(a^2 + 3ab)$ or $ab(2a + 6b)$ or $2ab$(2 term expression with terms in a or b or ab, can include constants), eg $2ab(1a + 3ab)$, $2ab(1 + 3b)$
			A1	for $2ab(a + 3b)$
15 (a)		0.47	B1	
(b)		2.28×10^9	M1	for correct value but not in standard form, eg $22.8 \times 10^{3+5}$, 228×10^7, 2 280 000 000 or for 2.28×10^n , $n \neq 9$
			A1	cao
16		T shown on the map	C1	for showing a perpendicular bisector or point T equidistant from points B and C.
			C1	for a circle or arc of circle of radius 2.5 cm or point T 2.5 cm from point A
			C1	for T shown in correct position

Paper 1MA1: 2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
17		98	P1	for process to find P(1), e.g. 1 – 0.17 – 0.18 – 0.09 – 0.15 – 0.1 (= 0.31) or for a process to find P(1 or 3), e.g. 1 – 0.17 – 0.09 – 0.15 – 0.1 (= 0.49)
			P1	for process to find the number of 3s, e.g. 0.18 × 200 (=36) or process to find the number of 1s, e.g. P(1) × 200 (= 62), or process to find the number of (1 or 3)s, eg [P(1) + 0.18] × 200 or process to find any expected frequency, using any probability × 200, eg 0.17 × 200
			A1	cao
				OR
		98	P1	for process to find P(2 or 4 or 5 or 6), eg 0.17 + 0.09 + 0.15 + 0.1 (= 0.51)
			P1	for process to find the number of (2 or 4 or 5 or 6)'s, eg "0.51" × 200 (= 102)
			A1	cao

Paper 1MA1: 2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
18		Yes (supported)	P1	for process to work out the total number of children, e.g. 117 × 4 (= 468)
			P1	(dep P1) for process to work out total number of adults or the total number of people, e.g. "468" × 5 ÷ 2 (= 1170) or "468" × 7 ÷ 2 (= 1638)
			A1	for 1170 or 1638
			P1	for process to work out the percentage of theatre full, e.g. $\frac{"468"+"1170"}{2600} \times 100$ (= 63) or for a process to work out 60% of 2600 (= 1560)
			C1	for a correct conclusion supported by correct figures e.g. 63% or 1560 **and** 1638
				OR
			P1	for a process to work out 60% of 2600, eg. $\frac{60}{100} \times 2600$ (= 1560)
			P1	(dep P1) for process to work out total number of children, e.g. "1560" × 2 ÷ 7 (= 445(.7...)
			A1	for 445(.7...)
			P1	for process to work out number of children in the circle, eg. "445(.7...)" ÷ 4 (= 111 to 112)
			C1	for a correct conclusion supported by correct figures e.g. 111 to 112
				[Where appropriate, accept rounded or truncated values]

Paper 1MA1: 2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
18 cont.				OR
			P1	for a process to find the maximum number of children, eg. 2600 × 2 ÷ 7 (= 742(.8…))
			P1	for process to work out the total number of children, e.g. 117 × 4 (= 468)
			A1	for 468 and 742(.8...)
			P1	for $\frac{"468"}{"742(.8..)"} \times 100$ (= 63) or process to work out 60% of "742.8.." (= 445(7..))
			C1	for a correct conclusion supported by correct figures e.g. 63% or 468 and 445(.7...)
				[Where appropriate, accept rounded or truncated values]
19		Side elevation	C2	for the side elevation (4 cm by 2 cm rectangle with a solid line drawn 1 cm from the 2 cm edge, and correct orientation)
			[C1	for the side elevation as a rectangle]
		Front elevation	C2	for the front elevation as a trapezium in correct orientation with base 4 cm, parallel sides 1 cm and 4 cm
			[C1	for the front elevation as a trapezium with two right angles]
				[Ignore incorrect or no labelling]

Paper 1MA1: 2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
20 (a)		57.1	P1	for a process to find time from Liverpool to Manchester, eg. 56 ÷ 70 (= 0.8 (hrs) or 48 (mins))
			P1	for a process to find the total distance, eg 56 + 61 (= 117) or the total time, eg"48" + 75 (= 123) or "0.8" + $\frac{75}{60}$ (= 2.05), with consistent units of time
			P1	(dep P2) for a correct process to find average speed with consistent units of time, eg."117" ÷ "2.05" or ."117" ÷ "123"
			A1	for answer in the range 57 to 57.1
(b)		explanation	C1	for explaining that the time taken for the two parts of the journey must be the same or the distance from Leeds to York is $\frac{3}{4}$ the distance from Barnsley to York oe
21 (a)		3.9	M1	for a ratio of $\frac{8.1}{5.4}$ (= 1.5) oe or $\frac{5.4}{8.1}$ (= 0.66..) oe or $\frac{2.6}{5.4}$ (= 0.48..) oe or $\frac{5.4}{2.6}$ (= 2.07..) oe
			A1	cao
(b)		2.05	M1	for $\frac{5.4}{8.1} \times 6.15$ (= 4.1) or $\frac{2.7}{8.1} \times 6.15$ oe or ft "scale factor" from (a)
			A1	cao

Paper 1MA1: 2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
22		Secure Bank (supported)	P1 P1 C1	for a process to work out the interest after one year e.g. 0.02×25000 (= 500) or 0.043×25000 (= 1075) or for 1.02 or 25500 or 1.043 or 26075 for process to find value of the investment after 3 years or the multiplicative factor for 3 years at one of the banks, e.g. $25000 \times 1.02 \times 1.02 \times 1.02$ oe (= 26530...) or 1.02^3 (= 1.0612...) or $25000 \times 1.043 \times 1.009 \times 1.009$ oe (= 26546...) or $1.043 \times 1.009 \times 1.009$ (= 1.0618.....) [accept total interest of 1530...or 1546...if final values of investment are not found] for Secure Bank from correct figures eg 26530.. and 26546..or 1530.. and 1546.. or 1.0612.. and 1.0618
23		$4.755 \leq n < 4.765$	B2 [B1	for $4.755 \leq n < 4.765$ for 4.755 or 4.765 or 4.764$\dot{9}$]
24		$x = -8$, $x = 3$	M1 M1 A1	for factorisation or for substitution into quadratic formula $(x \pm a)(x \pm b)$ where product of a and b = 24, eg $(x \pm 4)(x \pm 6)$ or difference of a and b = 5, eg $(x \pm 2)(x \pm 7)$ $\frac{-5 \pm \sqrt{5^2 - 4 \times 1 \times -24}}{2}$ oe (condone one sign error) for $(x + 8)(x - 3)$ or for $\frac{-5 \pm \sqrt{121}}{2}$ oe cao

Paper 1MA1: 2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
25 (a)		$5n - 2$	B2	for $5n - 2$ oe
			[B1	for $5n + k$, k may be 0]
(b)		No (supported)	C1	for No with evidence, e.g. $3 \times 4^2 = 48$, $\sqrt{48}$ is not an integer, he has multiplied by 3 first but should have squared first

Modifications to the mark scheme for Modified Large Print (MLP) papers.

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Angles: ±5°
Measurements of length: ±5 mm

PAPER: 1MA1_2F			
Question		**Modification**	**Mark scheme notes**
1	(c)	MLP and braille: *c* and *d* changed to *s* and *t*.	Standard mark scheme but change *c* & *d* to *s* & *t*
3		Grid enlarged. Key moved above the diagram. Right axis has been labelled. Boys shading has been changed to dotty. The vertical axis label has been moved above the vertical axis	Standard mark scheme
5	(b)	Pictogram enlarged. Key moved above the diagram.	Standard mark scheme
8		Wording 'nine' added	Standard mark scheme
9		Diagram enlarged. Angle sizes moved outside the angle arcs; the arcs have been made smaller.	Standard mark scheme
11		Grid enlarged. Right axis labelled. Axes labels have been moved to the left of the horizontal axis and above the vertical axis. In (a) Number '74' changed to '90'.	(a) becomes 35 to 37. In (b) suggest 180 to 200
13	(a)	Question reversed. Rotation drawn on the diagram and labelled as 'shape B'. Grid enlarged and *y* axis reduced so it finishes at 2. Shapes labelled 'shape A' and 'shape B'. Wording changed 'It shows shape A and shape B given on a grid. Describe fully the single transformation that maps shape A onto shape B.'	Award B1 for "rotation" Award B1 for "90° clockwise about centre O [or (0,0)] NB: award B0 for any indication of a mention of other transformations
13	(b)	Grid enlarged and y axis reduced so it starts at -2. Wording 'B' and 'C' deleted and shapes labelled as 'shape P' and 'shape Q'. Triangles P and Q moved above the *x* axis. Wording added 'It shows shape P and shape Q given on a grid.'	Standard mark scheme

PAPER: 1MA1_2F			
Question		**Modification**	**Mark scheme notes**
14	(b)	MLP only: *a* changed to *x* and *b* changed to *y*.	Standard mark scheme but change *a* & *b* to *x* & *y*
16		Number '250 metres' changed to '500 metres'. Points *B* and *C* moved to the right to allow for use of specialist equipment. Points *B* and *C* joined with a line. Scale moved above the diagram.	Standard mark scheme, but given the alternations to the given diagram, the relative positions of any constructions and the position(s) of *T* will change.
17		Table turned to vertical format.	Standard mark scheme
19		Alternative question. Model has been provided for all candidates. Diagram enlarged and also provided for MLP. The measurements on the prism have been doubled. Wording added next to the diagram of the trapezium 'Diagram NOT accurately drawn'. Four shapes have been provided below the trapezium labelled A to D. Wording added above the four shapes 'scale: 2 cm to 1 metre'. Question wording has changed and has been split into two parts: 'Look at the model or at the diagrams for Question 19 in the Diagram Book. They show a prism with a cross section in the shape of a trapezium. All measurements are in metres. Below the prism there are four shapes A, B, C and D. (i) Which shape shows the front elevation of the prism? (ii) Which shape shows the side elevation of the prism?'	Mark scheme amended as follows: (i) B2 for C (ii) B2 for A (B1 for B or D)
21		Diagram enlarged. Measurements '2.6 cm' and '5.4 cm' added to the diagram.	Standard mark scheme

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Question 17

This is another question where an explanation was required and students continue to find this difficult.
Very few students got both parts correct. For part (i) many did not appreciate the fact that more trials meant a better estimate, instead believing that more tails gave a better estimate. Some responses wanted the probabilities to be as close to a whole number as possible, and incorrectly chose Stuart for that reason. Other common errors were saying that Maxine's were better because they gave a closer answer to 50% or 0.5 or even and thus that she was not using a biased coin. A significant number said that Stuart's was better because he had thrown fewer.

For part (ii) the most common incorrect answers were 65% by simply calculating 70% (=7/10) and 60% (30/50) and then finding midpoint or just stating 0.5. Some of the students calculated separate probabilities without combining them. An answer of 37 was also common, showing the failure to write a probability in a correct format, a few ratios were seen.

Question 22

Part (a) was well answered. The majority of students had three probabilities summing to 1 in the table, earning at least one out of the two marks available. The most common incorrect answer was to give any two numbers that add to 0.8 or 0.8 twice.

Part (b) was less successful than part (a). Many students initially made the connection that 0.2 was equivalent to 12 cubes, therefore the 0.4 was equivalent to 24 cubes but did not always add correctly. Quite a few students related the number of cubes to the probability incorrectly, by assuming that if a probability of 0.2 is equivalent to 12 cubes, a probability of 0.4 must be equivalent to 14 cubes, giving the most common incorrect solution of 12+14+14.

Question 16

In part (a), it was rare to see both parts answered correctly. B was often identified as the least likely coin to land on Heads but A and D were very common choices for the most likely.

Many students correctly said that Julie was wrong in part (b) but their reasoning varied widely. Simply saying that coin C was biased was insufficient since this was given in the question. It needed to be clear that the student was referring to the probability of the $\frac{1}{3}$ given in the table. Students using decimal or fraction equivalents for $\frac{1}{3}$ often made errors in the conversion; 30% was a common error. A number of students referred to even chances or 50-50 chances or 'odds' rather than using the correct probability language.

Part (c) was often answered well. Many students tried to convert 0.033 to a fraction or a percentage usually making an error in their subsequent working. Many did not understand the use of the word "estimate" in the context of probability and believed they were required to

round off the numbers before calculation. Students who found the correct answer of 132 and then rounded to say 130 were not penalised, provided 132 was seen. A number of students were not explicit in the use of 0.033 and so any rounding made (eg. 0.03) without first writing 0.033 was given no credit.

Question 15

Most students completed the frequency tree accurately and scored three marks for their response to part (a). The errors seen were usually caused by arithmetic mistakes. Students should be encouraged to write down their calculations in the working space as those students who did this were usually awarded the first and second marks even where their entries in the diagram were incorrect.

In part (b) $\frac{29}{45}$ was the most common incorrect answer seen. Students who wrote this had clearly not considered carefully the statement in the question that "one of the 120 people is chosen at random".

Question 9

In part (a) the majority of students knew that the median was the middle number even if they tried to find the median without ordering the list. Those who gave the answer as 8.5 (middle of the unordered list) gained one mark. Most students did order the numbers with many then able to give the correct answer. Some attempts at ordering the list omitted one of the numbers, often one of the two 4s. A common error was to identify the two middle numbers as 4 and 6 and give an answer of 4 or 6 or 4, 6 or carry out an incorrect calculation such as 6 – 4 with the two numbers. Some students confused the averages and worked out the mean or the mode. A few found the range.

Part (b) was answered very well. Those who did not give the correct probability often gained one mark for a fraction with either the correct numerator or the correct denominator. A few students used incorrect notation for probability such as 2 : 6 and were awarded the method mark only. A common incorrect answer was 1/2. There were relatively few students who gave a likelihood rather than a probability as the answer.

In part (c) many students were able to use the information about the mode to identify one of the hidden numbers as 3 and gain the first mark. They then often went on to give the correct answer.

Some students showed 3 + 3 + 8 + 5 + 6 = 25 and 25 ÷ 5 = 5 in the working space but then gave 3, 5 as the answer and gained one mark only. It was common to see 3 on the answer line with a number other than 6 and no working out shown. Some students gained the first mark for working with the mean but did not use the mode to complete the solution.

Question 16

The fundamental part of this question was the first step, where students had to equate the sum of the probabilities to 1. Without using this, students were unable to gain credit for later processes. Once students had found that the sum of the probabilities for blue and green is 0.35, they had to divide this value in the ratio 3 : 4. This was done with varying degrees of success, many dividing by 3 and 4 separately rather than dividing by (3 + 4). Students were able to work in any suitable form (fractions, decimals and percentages) and those who worked in percentages were able to gain process marks with a missing % symbol. However, it did need to be present to gain the final accuracy mark.

Question 6

Both parts (a) and (b) were answered well, part (a) less so than part (b) with crosses seen between the ½ and 1 marks on the scale. While their intention is clear, some students could improve their accuracy by placing their marks more carefully.

Question 16

This question required students to interpret a pie chart, firstly to find the number of cars being represented in a sector followed by calculating a probability, with many finding both parts of the question challenging.

A range of approaches using either knowledge of the number of degrees in a pie chart or using proportionality could gain credit, with the most successful approach appearing to be to use an appropriate method to find the number of degrees per car or per 10 cars. However, many deducted the number of degrees difference for the two sectors from the number of black cars arriving at the incorrect answer of 125 or dividing by 10 rather than 9 when working with proportionality. Very few identified that the whole pie chart represented 540 cars and used this to work out the number represented by 80 degrees.

Students were required to combine knowledge of probability with interpretation of the pie chart in part (b). Whilst many gained a mark for using 50 as the numerator in a fraction, the majority were unable to also give a correct denominator. Common incorrect denominators included 100, presumably using percentage, or 360 from using the total number of degrees in a circle.

A small minority of students are still expressing a probability as a ratio rather than a fraction, decimal or percentage. Centres are encouraged to promote the use of fractions for probability in this type of problem.

Question 26

In part (a) many students were aware that probabilities should sum to 1 and it was not uncommon to therefore see two figures presented as their answer which added to 0.8; 0.6 and 0.2 were common. Splitting this so that one number was 0.2 more than the other proved impossible for many.
Part (b) was even less well answered, indeed left unanswered by many. A significant number tried to find the number of counters for each colour but were unsuccessful, not knowing to simply divide by 0.15

Some students tried $18 \div 0.15$ but then went on with other incorrect methods. $0.15 \times 18 = 2.7$ was a popular answer. Build up approaches were again evident, always unsuccessful.

Question 13

Both parts of this question were answered well. In part (a), the usual error was seen using incorrect probability notation. With there being just one mark for this question, answers such as 4 : 15, 4 in 15, 4 out of 15 or similar gained no credit.

In part (b), often the correct answer of 0.7 was written as 70% or $\frac{7}{10}$, both alternatives being perfectly acceptable. Some thought that as there were only two colours of counters in the bag then they must both have the same probability of being chosen, giving 0.3 as their answer.

Question 17

It was very pleasing to see so many students correctly relating the information given to the diagram before them. Very few errors were made, usually through carelessness when they were.

In part (b), the most common answers were either the correct answer of $\frac{12}{72}$ for two marks or $\frac{12}{32}$ for one mark where students just considered the adults and not the whole population. Giving the answer as a ratio 12:72 gained one mark

A significant number of students insisted on trying to give their answer as a decimal. If their initial fraction was seen, any attempt at converting to a decimal was ignored. However, some students only offered a decimal answer and this was virtually always incorrect.

Question 10

This question was well done with most students making an attempt at all parts.
Students were largely confident with part (a) but struggled more with part (b) with many putting a cross at $\frac{5}{8}$.
Part (c) was mostly accurate, with correct notation in fraction, decimal or percentage form, although some only gained one mark by using incorrect notation such as 5:8 or 5 out of 8.
Some did not relate the question to the list at the top of the page and gave an answer of $\frac{1}{2}$, presumably from the probability of choosing an even number from all numbers.

Question 7. Part (a) was answered well, the vast majority clearly understanding the concept of mode. In part (b) also, understanding of probability scales and probability in general was good. In (ii), some simply added a cross to the probability scale, failing to quote the actual numerical probability; this gained no marks. Some students are still using terms such as unlikely in terms of describing probability.

Question 6

Whilst most of the cohort could answer both parts correctly, students were slightly more successful in part (b).

Question 15

This question required students to compare the likelihood of two outcomes, showing all working, and performance was disappointing. Whilst many students could express at least one probability, very few could show one outcome was more likely than the other and chose to state a conclusion that was unsupported. Comparing the probabilities as equivalent fractions with a common denominator, decimals, percentages or even a ratio was acceptable. A lot of students listed all the numbers on a dice, and highlighted the ones which were less than three, or listed all the numbers on the spinner and highlighted those which were more than five, but did not write this as a probability and therefore gained no marks. These students then went on to conclude that the spinner giving a number greater than 5 was more likely because there were more available options. Some who did write it as a probability often

included 3 on the dice and/or 5 on the spinner, suggesting that there was a misunderstanding of 'less than 3' and 'more than 5'.

Of those who attempted to convert to a common format, many made the error of writing $\frac{2}{6}$ or $\frac{1}{3}$ as 0.3 or 30%

Question 7

Part (a) of this question was not particularly well answered with many struggling to choose between “likely” and “evens” (with many crossings out and changes of mind seen).

Even when the correct probability of $\frac{2}{4}$ was seen candidates tended to go from this to ‘likely’ as their answer.

In part (b) an answer of ‘certain’ was commonly seen. Many candidates showed misunderstanding of the 'less than 4’ element of the question by stating ‘impossible’, probably as there was no 4 on the spinner. These were by far the most common responses. Some gave an incorrect answer of 'likely'.

In part (c) there were many correct answers of 0.6 Not all candidates showed working, but this was not required to gain marks. Candidates mostly stated their answer as a decimal, with very few giving the fraction or percentage equivalent.

Question 11

Both part (a) and part (b) required students to select an appropriate description of the likelihood of an event occurring. A correct selection in part (b) occurred more frequently than in part (a), with over three quarters of the cohort correctly identifying evens for part (b).

Question 15

It was quite common for candidates to score full marks on the frequency tree. Where this did not always happen the majority of candidates scored 1 mark placing the 64 and 36 correctly. Most candidates scored well on part (b), recognising which values from the frequency diagram to use. Some candidates wrote their probability out of 100 or as a ratio but this was less common. A mistake seen a few times was when the candidates had missed the 'given' part of the question and included the UK holidays for families and couples which scored them zero.

Question 21

This question was mostly answered well as $200 \times 0.4 = 80$.
The common incorrect answer was $200 \div 0.4 = 500$.

Question 13

In (a) slightly less than half of candidates were able to find the required probability. Where correct answers were seen these were most commonly given as 100%. Common incorrect answers were likelihood statements such as 'very likely' or 'certain' or attempts to calculate a probability using the values of the £10 and £20 notes such as $\frac{10}{30}$ or $\frac{10}{40}$.
In part (b) candidates needed to work out the value of the 1p and 2p coins in the bag, use this to identify the number of 1p and 2p coins and give the probability of taking a 1p coin from the bag. Only a minority of candidates were able to reach the correct probability. Many more were able to gain 1 mark which was often due to finding the number of 1p coins and 2p coins. Some candidates were able to identify that there were 20p worth of 1p coins and 20p worth of 2p coins, but did not go on to find the number of 1p and 2p coins. Common incorrect

answers included $\frac{1}{2}$ which appeared to be from an incorrect assumption that there were equal numbers of 1p coins and 2p coins in the bag rather than the values being equal or $\frac{10}{40}$ or $\frac{20}{40}$. If given as a percentage candidates should note they need to include the % sign. Some candidates incorrectly gave the probability answer in a ratio form.

Question 11

Providing a valid reason with a decision was required in this written response question, with most students being awarded the mark for giving very clear and concise responses. A very wide range of explanations were seen and accepted, as shown in the mark scheme, and it was pleasing to see very few instances of contradictory reasons also being given compared to similar past questions. Where the mark was not given, the student had often argued that the statement was correct. Other responses that scored 0 involved statements that did not clearly indicate a decision, or statements that included incomplete statements such as 2 had a 90° angle without relating the angle to probability.

Question 23

This question was a good discriminator for this cohort, with the full range of different possible scores seen. Almost all students attempted the question and very few blank responses were seen. Many were able to gain the first mark, usually by working out $1 - 0.16$ and thereby showing some understanding of probability and some gained the first mark for working correctly with ratio to find the total number of discs in the bag, but this was seen less frequently. A score of 2 marks was also often seen, usually where students got as far as a probability of 0.46 but then did not know how to go further, or for working with probability and ratio separately but not knowing how to combine both skills correctly to make further progress through the problem.

Of the students who understood how to approach the problem and showed a complete process, many rounded their numbers prematurely, often reaching answers like 69, 70.5 or 71 and scored all but the accuracy mark. Centres should remind students to work with accurate values fully until the end of the question and avoid premature rounding or truncating.

Question 11

In part (a) of this question learners were asked to use the information given to complete the two-way table about the type of film liked by adults and children. There were a good proportion of learners who could complete this fully correctly using the given information and working out the missing values. Where incorrect answers were seen these generally had the given information correctly completed in the table but had errors in working with these numbers in order to determine the missing values. Some learners were able to complete some of the given values correctly but made errors in placing some values possibly due to the need to identify both the appropriate row and appropriate column to input the values in.

In part (b) of the question learners were asked to give the probability that a person chosen at random from the 500 was an adult who said that they liked action films the best. A majority of learners were able to give the required probability. There were a significant proportion of incorrect answers also seen, common incorrect answers were $\frac{100}{280}$ (the probability of an adult chosen at random saying that they liked action films the best), or 100/150, which was awarded 1 mark for the correct numerator, or completely incorrect fractions using a variety of different numbers from the table. There were a minority of learners who had a correct answer, but made errors when trying to simplify or convert their probability fraction (in these cases subsequent working was ignored) or gave their probability as a ratio which is not an acceptable form but which does gain method marks. Learners should be reminded that probabilities should be given as a fraction, decimal or percentage.

Question 19

In part (a) of this question learners were asked to work with the probabilities provided to find an estimate for the number of times the dice would land on 2. Learners found this to be a challenging question. Whilst a minority were able to find the required estimate, often by first finding the missing probabilities and then using these to make the estimation, the majority were only able to find the sum of the unknown probabilities or could not make any progress with the question. A common error was to add the given probabilities and divide by 2. The most common mistake was to give an answer of 0.15.

In part (b) of the question learners were asked how the answer to (a) would be affected if Kasim's assumption was wrong. Correct answers often referred to the answer to (a) being larger or there being more 2's. The majority of learners were not able to give a correct response to this question, referencing the probabilities changing, stating that the answer would change but not explaining how or saying that the answer would not change.

Question 7

There were occasions in this question where learners confused the statistical terms mean, mode, median and range, resulting in an incorrect method being used in either part (a) or more commonly in part (b).

Part (a) was answered well, with many learners aware of the need to sum the ages and divide the total by 8. There were a few arithmetic errors when adding, but if the full method was shown, learners could still gain 1 mark.

A variety of incorrect answers were seen, and very often these seemed to be statistics other than the mean. The most common errors seen were 10 (the mode), 11.5 (the median) and 6 (the range), all of which gained no marks.

Part (b) also had many correct answers from working out the range. Sometimes either the maximum or minimum was incorrectly chosen, and as in part (a) we also saw some incorrect statistics, most often the mean.

Less success was evident in part (c), with a larger than expected number of learners not being able to show the probability correctly on the scale provided. The most common incorrect response was to misinterpret the divisions shown on the scale and mark at $\frac{1}{8}$ rather than $\frac{1}{4}$.

Question 16

This question required learners to show working to support their choice and many showed a valid start to the problem by finding one suitable probability or proportion to gain the first mark and credit was often given for responses using ratios of 10 : 30 or 7 : 18. Comparable probabilities in a common format such as percentages, decimals, or written as fractions with common denominators or even common numerators were required for the second mark. However, whilst an initial probability or proportion was commonly seen, many learners made

no attempt to convert to a common comparable format so gained no further credit. Of those who recognised the need to compare in a common format, many gained full marks for providing accurate comparable figures and a correct decision.
For those working with ratio, many were unable to find two ratios with either the same left-hand side or the same right-hand side in order to make a comparison, with some then attempting to convert to fractions unsuccessfully.

Question 20

In part (a) of this question learners needed to work with the sum of all probabilities for the exhaustive outcomes being 1, together with information about there being twice as many blue counters as green counters in the bag, in order to find the probability of taking a blue counter. This was very well answered with many learners able to find that the probability of blue was 0.4. In some instances, a correct probability of 0.4 was seen followed by this being incorrectly identified as the probability of green or further working with the 0.4 such as $\frac{0.4}{0.6}$ or $\frac{0.4}{1}$ possibly because they thought the probability had to be a fraction, in these cases learners were awarded P1P1A0. Some learners were able to find that P(blue) + P (green) = 0.6, which was often seen as $1 - 0.4$ in the working space or where their two probabilities added to 0.6, and this was awarded P1. Incorrect approaches involved a variety of different arithmetic processes being applied to the values given in the question and included some instances of probabilities greater than 1 being given for blue or green or both. There were also instances

of this question not being attempted by learners which may have been an indication that they did not know how to start.

Part (b) proved more challenging for learners than part (a). In this part of the question learners were told that there were 45 red counters in the bag and were asked to find the total number of counters in the bag. The most efficient method to do this was to work out $45 \div 0.3$, however this was not a common approach. Most learners worked with the ratio of the probabilities in the table from (a). If the learner had an incorrect probability of blue and probability of green in the table in (a) then they were still able to reach the correct answer of 150 as long as their probabilities added to 1. In some instances, learners had probabilities that added to a total other than 1 in part (a) and could gain the method mark for working with their ratio of probabilities, but could not gain the final mark as the correct answer of 150 could be obtained from the information provided in the question.

Question 15

Responses to this problem-solving question involving probability varied in the level of success. Whilst some responses were fully correct, the question asked learners to show all their working, therefore, when 10 was given as an answer without working, no marks were awarded. The first mark was awarded for finding the total number of buttons by adding 12 to 20, but was not always shown, and the second for working with probability, which was usually shown as $32 \div 4$ or less commonly as a fraction. After this, some responses showed good processes for working towards the number of extra red buttons, while others showed confusion and made no further progress. The most successful responses showed clear labelling of what figures meant and appeared to help learners to keep track of their work, so centres should encourage learners to do this. A commonly seen incorrect answer was 8 coming from finding one quarter of the additional 12 buttons and adding the 5 original red buttons rather than using probability with the new total number of buttons.

Question 7

For part (a), the expected response was a cross (×) placed at $\frac{1}{6}$, being the first mark to the right of 0. Common incorrect placements included a cross at 0 or at the second mark to the right of 0.

For part (b), the correct placement was a cross at $\frac{2}{6}$ being the second mark to the right of 0.

Common incorrect placements included a cross at the first mark to the right of 0, at 0, or at 1.
In both parts, most responses placed the cross directly on the chosen mark on the line. Some placed the cross above or below the line; where the intended mark was clear, credit was awarded.

Question 17

In part (a), 3 marks were awarded for correctly completing all 6 values in the frequency tree. Where fewer than 6 correct values were given, 2 marks could be awarded for at least 4 correct values, typically including 37, 83, 21 and 16 or 37, 83, 21 and 44. One mark was awarded for at least one correct value, such as accurately placing 37 or 21 (values provided in the question) into the frequency tree. A common error was to enter 65 and 18 as the final two values, often due to misreading the question and not recognising that “have a scooter” applied to two separate branches.

In part (b), B1 was awarded for a correct probability. If the frequency tree in part (a) was incorrect (e.g. 83 was not used), a follow-through mark was awarded if the probability matched the values used in that tree. Equivalent forms such as 0.69(...) or 69(...)% were accepted. However, values needed to be given to at least two significant figures, answers such as 0.7 or 70% were not awarded B1. If the answer was given as a percentage, the % symbol had to be included.



Examiners' Report
Principal Examiner Feedback

November 2020

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Foundation (Calculator) Paper 3F

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GCSE (9 – 1) Mathematics – 1MA1
Principal Examiner Feedback – Foundation Paper 3

Introduction

The overall quality of the presentation of work was good. However, students need to read the questions carefully. There remain a concerning number of cases where students copy down the wrong figures from the question, mis-copy their own figures, or round figures almost randomly. Equally another error sometimes occurs when students prematurely round or truncate figures, either their own figures or figures from the calculator, which usually result in lost accuracy marks and could also make questions more difficult than they were designed to be.

Approaches to questions that required some interpretation or explanation were inconsistent. Questions 10 and 21 were answered well, but poor attempts were made in questions 15 and 26. On too many occasions students included contradictory or incorrect statements, which cannot be credited.

Within a broad range of questions, the paper was able to discriminate well. Weakest areas continue to be the application of ratios, scales and rates, but also algebraic manipulation and problem solving. Most demonstrated good use of a calculator, though on some occasions it was clear that they did not have an understanding of the way in which their calculator worked or did not have one at all, such as in question 9.

Questions which had a slightly unexpected approach, that is required more thought, caused immediate problems for many, even in the earlier part of the paper. This includes questions 18, 20 and 24. Question 25 to 29 were the more challenging questions for those striving to demonstrate ability at the highest grades available, and a significant proportion of students therefore failed to score on these questions.

There were far fewer attempts using trial and improvement approaches. These mainly occurred when students showed evidence of not having a calculator, mainly evident in questions 15, 18, 19 and 20 where non-calculator methods were also seen, such as multiple additions.

The inclusion of working out to support answers remains an issue for many; but not only does working out need to be shown, it needs to be shown legibly, demonstrating the processes of calculation that are used. This is most important in longer questions, and in “show that” questions.

Report on Individual Questions.

Question 1

This was a poorly answered question. Most students gave the correct answer of 3 but 300, 30 and 3000 were frequently seen.

Question 2

A well answered question with nearly all giving the correct answer of 8.

Question 3

This was not always answered correctly.

Question 4

There were few incorrect answers in this question.

Question 5

This was very well answered with few failing to gain the mark. The most common error was the absence of one of the numbers.

Question 6

A very well answered question. There were a few who gave the answer of 4 to part (a).

Question 7

Students were generally very successful with this question with most obtaining full marks. Those achieving partial marks tended to mis-read the shaded section and recorded the fraction unshaded instead leaving their answer as $\frac{1}{4}$. A significant minority failed to give their answer in its simplest form, usually leaving the answer as $\frac{12}{16}$.

Question 8

This question was generally well done with the majority dividing 200 by 25 (some with multiple additions of 25) and then completing the process of 9.75 × 8 and giving the correct answer 78. Some students preferred to list eight lots of £9.75. The most common errors were students multiplying the cost by 200 or by 25.

Question 9

Parts (a) and (b) were not always answered correctly, with students having difficulty with the order of operations on their calculators.

It was rare to see any correct answers to part (c). Knowing the meaning of the term “reciprocal” is clearly a weakness in students.

Question 10

Most students got the marks in parts (a) and (b).

In part (c) students were able to explain that the drop in the first 3 minutes was steeper than the last 3 minutes. Some struggled to articulate this and some forgot to agree and imply that Pam was correct. There were a wide variety of values presented by students, although this question assessed the interpretation of the graph rather than the accuracy of reading values. Students generally used suitable values to explain their reasoning. Some students didn’t use the graph at all but tried to explain that water cools more quickly when it is hotter.

Question 11

Many responses achieved full marks. Many managed to use the fact that angles in a quadrilateral sum to 360 or found the angle on the straight line to *y* was 70 degrees and score one mark. Not all students who correctly calculated angle *PSR* were able to complete this question correctly, deciding to go off in all sorts of related incorrect calculations. Some of the weaker students knew that angles on a straight line totalled 180° but chose to use angle *QPS* with angle *y* to sum to this total.

Question 12

Part (a)(i) was well answered. In parts (a)(ii) and (b) it was clear students did not properly understand the meaning of "term". This was evidenced by statement involving algebra, "*n*th term", "*n* –5" and numbers not relating to the sequence given in the question.

Question 13

Many students added up the numbers that they saw on the diagram to get an answer of 26. Many more managed to score at least one mark on this question as they identified the length of one of the missing sides, usually on the diagram. For some reason finding 2cm was much more prevalent than finding 6cm. Some then forgot to find the missing length of 6cm leading to an answer of 28. The majority understood the meaning of perimeter, but some divided the shape into rectangles and added together the perimeter of both rectangles. The other common mistake was trying to find the area.

Question 14

In part (a) most students understood the need to collect like terms and it was often done successfully. If full marks were not awarded, students usually achieved one method mark, usually for the 5*x*.
The negative sometimes caused problems when collecting the *y* terms. Common errors seen included $6xy$ and $5x^2 \pm y^2$.
Part (b) was well done by many with the answer 3 on the answer line, though a formal algebraic approach was not seen very often, students preferring to show 22 – 7 ÷ 5. Some showed "–7" written by the equation but this was not credited unless the next stage was shown by, for example, writing $5p = 15$. Few attempted to divide by 5 as their first step. The most common incorrect answer seen was 10 from subtracting the 5 and 7 from 22.

Question 15

There were some good attempts at this question, encouraging since there were several steps needed to get to the answer: division to get the number of packs and rounding 7.5 to 8 before calculating the cost. Conclusions were well stated. The common error was to work out the individual cost of the batteries in each shop and then find the cost of 30 which clearly demonstrated misunderstanding about the packs.

Part (b) was usually well stated with 'No' and a clear reason. Most calculated the cost of 30 individual batteries of £12 and £13.50 and stated 'No, shop A is still cheaper'.

Question 16

In part (a) the majority wrote the correct answer on the answer line. Some went on to convert their answer to a decimal which was unnecessary. It was also pleasing to see most students using the

correct notation for probability with only a minority using the incorrect notation of a ratio. Of those not gaining both marks, most earned M1 for $\frac{5}{n}$ or $\frac{m}{11}$.

In part (b) a common incorrect answer was 0.3, but the majority of students gave the correct answer of 0.7, which was sometimes written as an equivalent fraction.

Question 17

The majority of students attempting this question gained full marks. There were many who gained 1 mark for drawing only one 6cm line correctly, though quite a few struggled to draw an accurate isosceles triangle. Though they were not required in this question, there was very little evidence of construction lines/arcs drawn; it seemed most measured using their rulers.

Question 18

Many students secured one mark for providing an accurate conversion using the graph. However, others drew lines on the graph, not always correctly, but failed to take any accurate readings from these. Of those that did, most went on to complete the method, but many of these confused their $ with £ and so lost the method mark. Other students chose to take their initial reading near the origin, for instance using £5 = $6, which by the time they had multiplied it up to $345 was too inaccurate to give an answer within the range allowed. There was some misunderstanding of the scale on the $ axis, with some students assuming 1 small square = $1

Question 19

In part (a) to achieve both the marks, students needed to understand through proportional reasoning that the number of tuna sandwiches represented 40% of the total sold. Many students were not able to demonstrate this and as such scored no marks. There were some who adopted a bar modelling approach e.g. stating 40% = 56 so 20% = 28, and adding 56 + 56 + 28.

Part (b) was answered slightly better, but still demonstrated that students need more practice of ratio and proportion. Where students showed some understanding of what was required but chose to use a percentage of 18 to scale up were often not able to achieve a solution that was accurate enough.

Question 20

Students that were able to demonstrate some understanding of the context were rewarded with one of two process marks if they able to sum the total of money (200) that Akhtar, Ben and Carl had without the £10 notes or used the mean amount to calculate the total of all the money (240). After scoring one or two process marks there was a variable understanding of how to use these values to solve the problem. Of those who made mistakes many appreciated that the answer had to be an integer and rounded their mistakes rather than reflecting that there had to have been an error and a further check of their work was needed.

Question 21

Part (a) was answered well, with many students gaining the mark. The most common incorrect answer was $\frac{25}{50}$, a probability statement rather than a statement of the number of times.

In part (b) some students thought that the answer was Paula because "10 times was enough" as her approach was quicker. Lots of students had the right idea that the more trials, the more reliable your results, but some failed to actually say "Simon, because…" A common mistake was just talking about 100 throws and not making comparisons.

Question 22

This question was attempted by most students but very few correct plan views were seen. Most students incorrectly drew a net or a side elevation involving a square with a triangle attached. Out of the ones who scored any marks, most scored one mark for a square with sides 6cm, but without the diagonals drawn.

Question 23

Part (a) was not well answered. n^{15} was a common incorrect answer.

In part (b) c was usually shown correctly (frequently written as c^1 but often paired with d^4). Most achieved one mark for c or (less likely) d^3. There were a significant number of correct values for c found from an incorrect method.

In part (c) many students were unsure where to start and a common incorrect answer given was $2.5x > 7$. Of those students who did start to approach the question correctly, many ignored the inequality sign throughout the process getting $x = 2.8$ or $x = \frac{14}{5}$ and as a result could not gain the accuracy mark.

Question 24

Most students attempted this question but very few achieved full marks. The distance, speed, time triangle did not help in this question; students always seem to make more errors at this level when using it rather than taking an everyday approach to the problem. Some added the distances together and the speeds together then divided by 2. Quite a few students gained one mark, but more students gained two marks for finding the times as decimals and adding the two times but failing to convert the times correctly and ended up with 2 hr 75 mins or 3 hr 15 mins which were the most common answers seen.

Question 25

Error intervals remain a weakness and was poorly attempted. Some were able to correctly give 9.35 but rarely gave 9.45; a few 9.44 but not 9.4499...

Question 26

Many were able to secure the first process mark for finding the area of one of the lawns (45 m^2 or 140 m^2) or the amount of seed available (10kg) but did not proceed any further with many reasoning incorrectly that if 3kg covered 5 × 9 area, then 6kg would cover 10 × 18, more than is needed. Other students were successful in gaining the second process mark mainly for the coverage of 1 kg of grass seed ($15m^2$). The most successful approaches seen where students were able to reach the correct conclusion were finding the amount of grass seed needed (9.3…kg) and comparing it with 10kg or finding the area that could be seeded with 10kg ($150m^2$) and comparing it with $140m^2$.

Part (b) required reasoning supported by correct figures and as a result, students were not successful in gaining many marks.

Question 27

Part (a) was generally answered well, and most students were able to write at least two correct probabilities on the tree diagram, sometimes writing these as equivalent fractions of $\frac{2}{4}$2/6 and 4/6. Some students chose to try to use decimals for this problem but were not able to score any marks due to inaccurate approximations of $\frac{1}{3}$.

Having perhaps achieved one or both marks in part (a) many students lacked the knowledge that they needed to select the correct branches and multiply the fractions together and the few that did were rewarded with the marks in part (b).

Question 28

There were very few correct answers in part (a). There seemed little evidence of an understanding that the solutions could be read from the graph. A significant number attempted an algebraic solution, but their algebraic abilities were insufficient for such a task.

In part (b) there were a few who got full marks but for those who knew to read from the intercepts often included 2 with 0.6 and 3.4. Some spoilt their answers by writing the two values as coordinates. Other errors included those who attempted to substitute values into the equation, then plot the points on the graph, using algebraic solving/factorising methods or stating the *y* value at the minimum point.

Question 29

Many started off knowing that they needed to multiply the dimensions 6, 4 and 10 but many failed to take into account that the end shape was a triangle and division by 2 was required. The biggest failing, after calculating the volume correctly, was to divide by 0.8 getting the answer 150. For those students that only omitted division by 2 there was a special case mark for the answer of 192.

Summary

Based on their performance on this paper, students should:

- accurately transcribe figures taken from the question, and taken from their own work
- avoid rounding or truncating answers, and to use the most accurate values in subsequent calculations
- ensure that their work is legible for examiners to consider awarding marks. For example, avoid any possible confusion when writing 1s and 7s, when writing 4s and 9s, and even when writing 0s and 6s.
- ensure that they include working out to support answers
- work on algebraic manipulation and derivation, and application of ratios, scaling and rates in preparing for future examinations.
- learn the meaning of technical terms such as “reciprocal”, the “term” of a sequence and error intervals
- continue to need practise answering response type questions where a written explanation is required.

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Examiners' Report
Principal Examiner Feedback

November 2022

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Foundation (Non-Calculator) Paper 1F

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GCSE Mathematics 1MA1
Principal Examiner Feedback – Foundation Paper 1

Introduction

The paper offered an opportunity for students of all abilities to demonstrate their understanding of a variety of mathematical concepts.
The early questions acted as a good confidence building way into the paper, with many students gaining a good proportion of the early marks.

Lack of careful reading of some of the questions was a cause for concern; particular ones are quoted in the summary below. Also worrying is the number of arithmetical errors that featured in many students' work. Simple application of the four rules was found wanting on many occasions. For example, 10000/8 being seen as 8/10000. Students should be encouraged to check working before being totally satisfied with their answers.

Some students were clearly avoiding tackling questions that involved algebraic techniques. These attempted trial-and-error methods from quite early on in the paper, even for the simpler questions where an algebraic approach was straightforward.

The quality of handwriting from some candidates made their responses difficult to read. Students are advised to avoid rushing through their work.

Areas of the curriculum that need more attention are, Geometric reasoning (Q9b), Describing transformations (Q11), Equation of a straight line (Q11bii), Fractions (Q20), Indices (Q21) Comparison of ratios (Q24) and Factorisation of polynomials (Q26b).

Again, it was pleasing to see many students clearly showing their working and utilising their communication skills when required. This continues to be an area of improvement.

Report on individual questions

Question 1. This first question was generally well answered and served as a good introduction to the paper. Correct answers of $\frac{3}{10}$ or $\frac{30}{100}$ were the most common.

Question 2. This question was usually answered correctly although an answer of 6 (3×2) was a common mistake.

Question 3. Another well answered question with few mistakes. It was pleasing to see most able to follow the correct order of operations.

Question 4. Although 10 and/or 12 were seen more often than not, a number of students failed to gain the mark by offering extra, incorrect values. 6 being the most common seen.

Question 5. Many students failed to score in this question by not simplifying the given expression fully. $3w \times 5t$ and $15 \times wt$ were popular partial simplifications gaining no marks.

Question 6. It was very pleasing to see so many students gaining good marks on this multi-step question. The vast majority gaining 2+ marks. In general, marks were lost through not reading the question carefully. Often just one child was considered, or two adults were included. Another common mistake was to omit the cost of petrol while in other cases it was seen as a cost for each person. Poor arithmetic often denied many full marks, mainly with the addition of two child tickets (the only non-integer), or with an inability to line up integers and non-integers successfully in a column addition method. Some gave the total cost of the trip instead of the change.

The standard of presentation of answers was lacking, in some cases, with little structure or order to what they were doing

Question 7. Part (a) was answered well, the vast majority clearly understanding the concept of mode. In part (b) also, understanding of probability scales and probability in general was good. In (ii), some simply added a cross to the probability scale, failing to quote the actual numerical probability; this gained no marks. Some students are still using terms such as unlikely in terms of describing probability.

Question 8. Part (a) was answered well, with very few failing to score the mark. Candidates performed less well in part (b) with many not collecting the like terms of $3n$ and n together as a first step. Many tried to subtract the n from both sides of the equation either resulting in $2n = 24$ (giving $n = 12$) or $3n = 24$ (giving $n = 8$). In this question, students usually scored no marks or full marks. Some used an embedded solution, with mixed success. Many candidates who achieved full marks did not attempt the algebraic approach and instead simply stated that $3 \times 6 + 6 = 24$, with a correct answer on the answer line.

Question 9. Part (a) was well answered with the vast majority subtracting 70 from 360 to get a correct answer of 290°. However, a great many were unable to give a correct reason for this answer in part (b). The most common incorrect explanation related to a circle "having 360°". Students need to be made aware that such an explanation is not acceptable. Many simply explained how they did it, rather than why e.g. "I subtracted 70 from 360". Students should be reminded that a calculation is not a reason.
In this case "angles at a point sum to 360°" or words to that effect is the reason required.
A common incorrect approach was to work with 180° rather than 360°.

Question 10. Most students correctly worked out that 5 was the greatest number of jars of coffee that could be bought for £23 in part (a). In part (b), a large number of candidates lost the mark as they hadn't read the question carefully enough, missing the word "exactly" in reference to the number of jars to be bought at half price. Many realised that Michael could now buy an extra 11th jar but then lost the mark because they answered 'yes' to the question "Is Michael correct?".

Question 11. Whilst many students correctly wrote down the scale factor of 2 in (a)(i), only a very small minority were able to pinpoint the centre of the enlargement in (ii). Many tried to position their centre either in between the two shaded triangles, in the centre of one of the triangles or on one (or two) of the vertices. In some cases, students who were able to draw lines to intersect at the point of enlargement identified it correctly but missed the mark because they also placed 'X' somewhere else on the graph.
In part (b)(i), accurate drawing of the mirror line was good. Whilst lines drawn with a straight edge are preferred, freehand, dotted or dashed lines were acceptable. In part (b)(ii), unfortunately, very few students were able to give the equation of their line. Common incorrect lines drawn were $x = 4$ or $y = 4$, which in some cases allowed a follow through mark if they stated this as their equation for (ii).

Question 12. Again with this multi-step problem in part (a), it was pleasing to see many students gaining good marks, often 2 or more. In this question, students had to find a sixth and 20% of 120 minutes. When performing calculations of this type it is important for students to show their working, eg $120 \div 6$ or $\frac{20}{100} \times 120$ so that credit can be awarded for correct method if errors are made with accuracy. In solving this problem, some students subtracted 50 from 120 to give 70 minutes and used this as the time spent playing badminton. Arithmetic errors were seen far too often from students when subtracting from 120.
In part (b), many ignored the good work they had done in part (a) and explained that Elana did not get to the café on time because she spent 2 hours at the sports centre making it 3.30pm when she left. This part followed through the working and answer in part (a) and the mark awarded if the reason and working were correct for the time given in (a).

Question 13. Part (a) was answered correctly by the majority of students, reading 60 from the bar chart. Part (b) was answered less well when a certain amount of extrapolation was required from the chart. 210 was a common incorrect answer.
In part (c), it was evident that many students weren't able to accurately read data from a composite bar chart, many reading the number of men as 90, women 200 and children 280 in 2020. The method mark here was awarded for sight of 80 (children) or 200 (men + women) used in a ratio. Many gained this mark but failed to score full marks as a result of incorrect values read from the chart. As a result of not reading the questions correctly, some students wrote an answer of 80 (child) : 90 (men) : 110 (women).

Question 14. Greater success was achieved in part (a) of this question by finding the sum of the distance travelled in one hour (54 miles) and the distance travelled in half an hour (27 miles). It was pleasing however, to see many students correctly quoting the equation distance = speed × time to solve this problem, although accuracy was often lost through incorrect use of the units of time. 54 × 90(mins) or 54 × 1.30 were common errors made.
In part (b), very few students were able to correctly convert from centimetres to kilometres. Many gained one mark for using the scale on the map correctly, 25 000 × 6. Credit was then given for a reasonable attempt at the conversion of 150 000 cm to km, usually just dividing by 1000. Most didn't seem to be clear that they had found a measurement in cm by multiplying by 25 000, those who did include units were more likely to be able to convert correctly as they often spotted that they could convert cm to m then m to km.

Question 15. The diagram proved very useful in getting one correct coordinate, for which one mark was awarded, usually $y = 1$, but rarely was a fully correct answer seen. Whilst many students did use the diagram, drawing the correct line segment, it was also rare to see the correct positioning of the required midpoint. This was often seen placed on the y-axis.
There were very few instances of candidates using written methods to find the midpoint.

Question 16. Those students who attempted an algebraic solution often picked up good marks, 2 or more, for a correct expression for the perimeter and then equating it to the given value of 52. Simplifying their algebraic expression often proved more difficult and it was not uncommon to see quadratic terms creeping in. Some students assumed all the lengths to be the same and calculated 52/4 gaining no marks.
Some students correctly found the value of x and then failed to answer the question by finding $2x$, the length of DC. Poor arithmetic let many students down in being unable to divide 57 by 6 and hence not being able to achieve the accuracy mark.
Many students did however adopt a trial and improvement approach which usually cost them a great deal of time for little reward.

Question 17. Again, understanding of probability was good and many students gained the full 2 marks in part (a). One mark was awarded for sight of 100 – 30 (= 70) or a correct value for the probability of taking a blue counter. $\frac{3}{4}$ was a common incorrect answer by some of the less able students, assuming there was an equal number of coloured counters. Students should be reminded that expressing a probability as a ratio is not an acceptable form for this answer.
In part (b), the correct answer of 45 was the modal answer, with incorrect methods following no particular pattern. A common incorrect attempt was also to try to share 30 in the ratio 2 : 3.
Part (c) followed through student's answers in (b). Explanations were usually acceptable, such that 25 counters could not be shared equally between red and yellow. It should be noted that just saying '25 can't be divided by 2' gained no credit. Also, students should be aware that any calculations given as evidence in such questions need to be accurate.

Question 18. Many students were unable to make any progress in this question by not reading the question fully and jumping in to either find a half and/or a twelfth of 240 or to divide 240 by 5, then 3 then 2. Those that correctly divided 240 in the ratio 5 : 3 : 2 usually went on to gain good marks. Many scored 3 marks for finding the numbers of cans remaining, 120, 36 and 44 but were then unable to find the required percentage of cola cans remaining. Finding one number as a percentage of another is an area that needs addressing. Those that did find a percentage were often successful by simplifying their fraction of 120/200 to 60/100.

Question 19. The factorising of 500 was usually carried out with the aid of a factor tree diagram, many of which were seen to be fully correct. Failure to gain full marks was usually down to not giving their product of prime factors as powers as requested, often just leaving the factors in a list. Many arithmetical errors in the construction of a factor tree and some misunderstandings in the concept were seen where the sum instead of a product was given. Centres should emphasise here that complete tree diagrams should have each final branch ending in a prime

Question 20. In part (a), those students who dealt with the fractions and whole numbers separately often gained greater success in achieving full marks, although an answer of $3\frac{4}{9}$ was not uncommon.
Although no credit was given for simply converting the mixed numbers to improper fractions, many did so accurately and then were able to convert both to a common denominator with at least one correct numerator to gain one mark. However, the answer following this approach was often left as an improper fraction, $\frac{77}{20}$. Unfortunately, many just added the numerators and the denominators to give an incorrect answer of $\frac{17}{9}$.
Part (b) proved to be a much greater challenge for many students, many tried to concoct means of dividing $2\frac{2}{3}$ by 6 to get $\frac{4}{9}$, a few students however correctly changed $\frac{8}{3}$ to $\frac{24}{9}$ and divided this by 6 to get $\frac{4}{9}$. The most successful approach was $\frac{8}{3} \times \frac{1}{6}$ showing an ability to divide a fraction by a whole number. Some had success by transposing the problem to show that $\frac{4}{9}$ multiplied by 6 is equal to $2\frac{2}{3}$, although $\frac{24}{54}$ was often seen.
Many students seemed to not understand the requirements for this question.

Question 21. It was clear that the rules of indices are known by many students but the application of them was very poor. $(2^{-5} \times 2^{8})$ was often written as 4^3. This had to be carefully marked as 4^3 as a final answer was an acceptable Special Case answer for one mark.
Sometimes 2^{-10} or 2^{16} were seen but rarely both.
Less able students often unsuccessfully tried to evaluate the terms before finding a product or squaring and had little understanding of negative indices. Occasionally 2^3 was seen for the method mark but this was followed by 2^5. Working with negative numbers continues to be a problem with -5+8 being evaluated as 13 or -13. Many worked exclusively with the powers and did not include the base number at all; -5 + 8 = 3 was often seen.

Question 22. It was common to see the digits 128 quoted in the working or in an answer, but rarely was the fully correct answer of 0.00128 seen. Very few seemed to know the rule of finding the product of the numbers and then counting the decimal places in order to position the decimal point. Many used long multiplication techniques, usually to no avail. It was rare to see an answer given in standard form. Method marks were sometimes gained for arithmetic errors in working but with a correctly positioned decimal place.

Question 23. This question was not answered well at all. Sampling techniques were not well understood at this level. Many either multiplied 40 000 by 80 or divided by 15. Attempts to divide 40 000 by 80 often introduced arithmetic errors, some just left 500 as their answer and those that knew to multiply by 15 struggled to do so correctly. Some students tried to work with percentages which rarely gained any credit eg 15%.
Students need to be encouraged to consider the suitability of their answers as some offered answers which were greater than 40 000, the total number of cars produced.

Question 24. Students at this level find the comparing of ratios particularly challenging. The most common error in part (a)(i) was to add the values of *b* in the ratios to give a triple ratio of 1 : 9 : 5 or used some of the numbers in the given ratios and gave an answer of 1 : 3 : 5. Some using a correct common multiple often spoiled their final answer by more arithmetical mistakes. Although (i) was poorly answered many picked up marks for correctly following through with their values for *a*, *b* and *c* in part (ii).
In part (b), few students were able to make significant progress. Those who assigned values to *m*, *n* and *p* were often successful, but this was rare. The substitution of $n = 2m$ into $p = 5n$ was rare also but usually successful when seen. Occasionally answers lost the accuracy mark for an incorrect order of 10 : 1 or for including letters in their final answer, eg. 1n : 10n.

Question 25. This was very poorly answered. The formula and the force both being given meant there was only the need to work out the area by multiplying 4 by 2. Some students still think that when working with area, they need to square the values first before using them to divide into 10 000. Those who correctly worked out the area usually tried to divide 10 000 by 8, for one mark, but often then failed, again through poor arithmetic. Some stated the area as 6 (4 + 2) and therefore gained no credit.

Question 26. There were many trial and improvement attempts to answer part (a) of this question, the majority of which were unsuccessful, however a few did throw up the critical value of 6. Those following an algebraic approach were able to score one mark initially for a correct process to start a solution. Subtracting 3 from both sides was usually successful but multiplying both sides by 2 was often carried out incorrectly by omitting to multiply the 3 by 2 resulting in $5x + 3 > 36$ or $5x + 3 = 36$. A correct first step was often followed by an incorrect second step or no second step at all.
Replacing the inequality by an equality is not penalised but students must remember to replace the inequality for the final answer. Far too often an answer of $x = 6$ was given.
In part (b), the ability to factorise a polynomial was sketchy. Factorisation of the first two terms [eg. $x(x + 10) + 9$] was often seen but this gained no credit.
$(x + 10)(x – 1)$ was also a common incorrect answer seen. Common incorrect answers included $(x + 1x)(x + 9)$ or $(x + 9x)(x + 1)$

Summary

On the evidence of performance on this paper, students need to:

- take greater care when reading the questions. Performance in questions 6, 10b, 12 and 18 in particular was severely affected by this.
- take care when carrying out arithmetic operations and check their working to avoid careless errors.
- write clearly so that correct values quoted are not altered in subsequent working.
- show clear methods of working particularly in basic calculations such as finding fractions or percentages of quantities.
- set their working out clearly, crossing out working that is being replaced.
- be able to convert using metric units of distance.
- be clear on the specific wording required when giving geometric reasoning

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GCSE (9 – 1) Mathematics – 1MA1
Principal Examiner Feedback – Foundation Paper 1

Introduction

This paper provided good coverage across the specification and allowed students the opportunity to demonstrate their ability across the grades. Plenty of success was seen across the early part of the paper as students showed confidence picking up marks in the first half of the paper.

Challenges arose when questions contained a context and with it large amounts of text; extracting the key pieces of information and applying it using the correct mathematical processes are an area for improvement. Good amounts of working out were seen which certainly helped students, especially those which had arithmetic errors as part of their solution.

Question 21 onwards proved challenging for this cohort with very few students gaining full marks and the mode score being 0 marks on almost all questions. Nevertheless, the majority of questions were at least attempted in a bid to gain some credit.

For those questions requiring a written conclusion, most responses did have some sort of decision showing that students are well-accustomed to this sort of demand in a question.

Areas of the specification that need to be improved upon are highlighted in the list at the end of this report.

REPORT ON INDIVIDUAL QUESTONS

Question 1

A good number of students were able to give a correct answer of 6 but there were a significant number who did not and a wide variety of incorrect answers were given. The most common incorrect answers were 4 (from finding the median) and 5 (from finding the mean).

Question 2

This question was answered well with the majority of students able to give a correct answer of 31. Of those that didn't gain B1, 209 was the most common incorrect answer from adding instead of subtracting; 41 was also seen when students were unable to deal with the tens correctly.

Question 3

This simplifying question saw mixed results. The majority of students were able to give a correct answer of $12a$ but there were a variety of incorrect answers seen. Students should note that this

type of simplifying question requires no multiplication signs in the answer; $12 \times a$ and $3 \times 4a$ were often seen and gained no marks.

Question 4

Measuring angles is an area of the specification that needs attention. Although some students did gain a correct answer in range, with 40 most commonly seen, there were a whole range of incorrect answers given such as 35, 50 and 140.

Question 5

The majority of this cohort were able to gain B1 for a correct answer of 60. Of those that didn't, 50 and 150 were the most common incorrect answers seen.

Question 6

The majority of students gained 3 marks for an answer of 2300 on this question. For those that didn't it was an error in conversion which was often seen with 1 litre = 100 millilitres being the most common incorrect conversion used; these students could still gain 1 mark if they had a correct process to find the difference using one of the incorrect conversions stated in the mark scheme. Those students who converted 3 litres into millilitres were more successful than those who converted 700 ml into litres and errors in arithmetic were noted when doing 3000 – 700. A small number of students arrived at 2300 but spoiled their answer by then trying to convert to litres; this was still allowed if the student gave an answer of 2.3 litres but 2.3 on its own lost the A mark and this was seen on occasions. Some students also missed that the question was about 3 litres and instead subtracted 700 from 1 litre (1000 ml) obtained 300 ml and gained no marks.

Question 7

Part (a) was answered very well with the majority gaining B1 for an answer of 15. Some students found the difference between 1 and 5 and added this to 3. Part (b) saw less success with more incorrect answers seen than in (a), the most common being 10 from dividing 20 by 2 instead of 4. There were still a good proportion of the cohort who gained B1 for an answer of 4.

Question 8

Part (a) saw mixed results. A good number of students were able to find the correct frequencies for 2 marks. Many gave the correct frequencies in the tally column and something incorrect such as frequency/24 as a fraction which gained 1 mark. Some also confused the definitions of tally and frequency and put the information in the wrong column. It was encouraging to see that a number of students were crossing out items in the list as they entered their tally marks in the frequency table and were using the correct bar notation for recording the tallies. Part (b) was answered well with many gaining B1 for a correct answer; those that didn't often gave a number

for their answer instead of the correct word. Part (c) saw the full range of marks awarded with most students gaining full marks. Of those that didn't, the most common error was an incorrect linear scale, although these students could still gain 2 marks for labelling bars and correct height bars for their scales and many did. Students often struggled to correctly scale the vertical axis, sometimes writing the numbers between the squares instead of on the gridline or using multiples of 3 or 5 which often led to errors.

Question 9

For part (i) and (ii) the majority of students answered the questions correctly to gain 2 marks. Of those that didn't, giving the answer in an incorrect notation, such as ratio, was often the issue; students should be reminded that correct notation for probabilities are fractions, decimals or percentages. Some students gave an answer of $\frac{8}{22}$ for (ii), e.g. the probability for 'pink' instead of 'not pink'. In (iii) the majority of students gained B1 for a correct answer with 0 and $\frac{0}{22}$ given in equal measure. Incorrect answers generally involved incorrect notation such as 0:22 or worded answers, e.g. impossible.

Question 10

It was pleasing to see the majority of students gain 3 marks on this question. The most common process seen was to divide 60 by 20 and then multiply 250 by 3 to arrive at 750. The majority of students who reached this point also gave a positive decision to gain the full 3 marks. Some students used a 'build-down' process starting at 900 and subtracting 250 three times to deduce there would be 150 grams left. Some students attempted to find the amount needed for one cookie and go from there but this process often led to arithmetic errors. Common incorrect processes often revolved around arithmetic errors and a small number of students reached an accurate figure to compare but gave an incorrect or no decision. Some students worked with the other ingredients too but this was ignored as long as it did not contradict their final answer. A number of students believed doubling and then doubling again went from 20 to 60 rather than 80 and therefore gained no credit.

Question 11

Less than half of students in this cohort were able to gain 2 marks for a correct enlargement. Of those that didn't, the main error was in the height of the triangle and the positioning of the top vertex; most were able to gain B1 for a base of 6 cm. Some students misread the scale factor and enlarged the shape by a different scale factor – usually 2 – if done correctly B1 could still be gained.

Question 12

Part (a)(i) was answered well with most students able to gain 2 marks for an answer of 26. Of those that didn't, it was common to see incorrect algebraic expressions such as $6g + 20h$ and 23 + 45 was often seen. Part (a)(ii) saw less success with many students unable to make any progress with the substitution. Many were unsure as to which letters should be substituted for which values and substituting g for 38 was often seen. For those that did manage to show a correct substitution, some were able to rearrange correctly to reach an answer of 13. One commonly seen incorrect answer was $g = 26$. Students should be advised to write the correct answer on the answer, on occasions 13 could be seen embedded in a calculation but the wrong answer given on the answer line, leading to 0 marks. Part (b) saw mixed results as less than half of students in this cohort gained 2 marks. Of those that didn't, many gained 1 mark, usually in one of two ways; successfully working out 3×-3 as -9 but being unable to accurately subtract 2 or for a full substitution; common incorrect answers included -7, 7 and 11. Some students wrote notes saying 2 negatives make a positive, leading to the misconception that the negative for the 9 and the subtraction sign meant the two values needed to be added, leading to an answer of 11.

Question 13

This question saw the full range of marks awarded. Some students were able to work through the process to reach an answer of 23p or £0.23. Of those that didn't, it was common to see 2 or 3 marks awarded, in particular for students who reached 160 or 460 but could go no further. Those that earned 3 marks gave a complete process with arithmetic errors in the process. It is encouraging to see that more students are fully demonstrating their method enabling them to gain marks despite their final answer being incorrect. Centres should continue to encourage their students to set out their working in a logical order so that they can access Method and Process marks. Some students dealt with the information and started the process incorrectly such as $100 \div 3$ or started correctly e.g. $100 \div 5$ but went wrong after that such as 20 + 8 and an answer of 28p. Some students incorrectly divided £3 by 5 following their process of dividing 100 by 5, resulting in an answer of 60p or 68p (after adding 8p) whereas others mixed up units within their working, e.g. 300/100 = 3g instead of 3p.

Question 14

This question saw the full range of marks awarded. Of those students who managed to plot the correct 5 points it was usual to see this accompanied by a straight line through the points. Some students gained 2 marks, usually for a line segment through 3 correct points; students should be able to recognise that an equation of the form $y = mx + c$ produces a straight line and therefore if one point is not in line with the others it will likely be incorrect. Some students gained 1 mark for producing 2 correct points either plotted or stated in the workspace but there were difficulties in calculating y when x was negative. More than half of the cohort gained 0 marks so this is an area of the specification that needs to be worked on.

Question 15

This question saw the full range of marks awarded. The majority of the cohort made a good start with a process to find 25% of 12,000. It was common to see students using the build-up method to work out percentages of amounts but this alone could not be credited with method or process marks if arithmetic errors were made and the process is not complete e.g. all steps seen such as 10% = 12,000 ÷ 10 = 1,200. Many then picked up the 2nd process mark for subtracting the deposit from 12,000 and also the 3rd for a complete process. It was common to see the accuracy mark not gained as students were unable to carry out the arithmetic for the division; 405 and 45 were commonly seen incorrect answers. Some students were not able to gain the first P mark but were able to gain the second and third P mark for a correct process using their deposit value and this was often seen. 12,000 was often misread as 1,200.

Question 16

Around two thirds of this cohort were able to gain 2 marks by reaching a value to show that Shah had passed the exam, usually 42 or 75(%). Some students had a correct method but could not carry it out accurately. Others were not able to gain any marks as they set up a fraction such as $\frac{45}{60}$ but were not able to go any further. Some students reached 42 or 75 but failed to interpret the results correctly, often saying that Shah did not pass the exam.

Question 17

The majority of students were able to gain at least 1 mark for correctly inverting the second fraction and multiplying. It was common to see the second mark gained too, usually for reaching $\frac{18}{5}$. Students who attempted to find a common denominator, e.g. $\frac{18}{30} \div \frac{5}{30}$ often made no further progress. The final step proved to be the most challenging for this cohort but some were able to successfully convert to a mixed number. Students should read the demand of the question carefully as 3.6 given as an answer was seen.

Question 18

The majority of students opted to use column multiplication for this arithmetic question. Some students managed correct place value in their structure and a good number of those managed to reach the digits 1512 to gain the first accuracy mark and place the decimal point correctly to the gain the full 3 marks. Common errors seen were incorrect place value in the columns, as well as incorrect arithmetic when adding the columns, usually arriving at the digits 378 or in trying to break down the components but only using 6 × 2 and 0.3 × 0.4, giving an answer of 13.2. Some students reached 1512 but were unable to place the decimal point in the correct place; centres need to continue to encourage students to use approximation to decide on a sensible place for their decimal point.

Question 19

It was rare to see a correct answer in (a)(i) with incorrect answers of 0 and 5 seen often. (a)(ii) also saw little success with the majority of students gaining B0; common incorrect answers included 0.05, −10 and −25. Part (b) saw mixed results, some students were able to make a correct first step, usually adding the powers for the numerator to reach 2^9. From there students either went onto gain 2 marks for a correct answer or incorrectly simplified, with $2^9 \div 2^3 = 2^3$ most commonly seen. A good proportion of the cohort gained no marks, making an incorrect first step such as $2^5 \times 2^4 = 4^9$ or $2^5 \times 2^4 = 2^{20}$. Some students also evaluated the terms as ordinary numbers and worked from there; if 64 was reached this gained M1 and was seen regularly.

Question 20

Part (a) saw most students make a good attempt at a factor tree. A good number of students were able to complete their factor tree accurately and also write their prime factors as a product. The factor tree was attempted by most students and well set out. There was a good understanding of the need for prime factors and very few included 1. Of those that did not gain 2 marks, common errors included incorrectly considering 39 as a prime number and arithmetic errors when considering the next pair of prime factors. For part (b) it was more common to see 1 mark gained rather than 2. Students were able to produce either the prime factors of 130, at least 4 factors of 156 or 130 or a common factor of 156 and 130. Of those students who gained no marks, finding the lowest common multiple was the most commonly seen incorrect method.

Question 21

Part (a) saw the full range of marks awarded. Some students completed a fully correct process to reach an answer of 3.5 or equivalent. Of those that didn't, some reached as far as $14 \div 4$ but could not follow the process through with 3.2 quite often seen as the result of the division; students and centres should note that $\frac{14}{4}$ gained full marks. Some students were able to find the total length of the 5 sticks but made no further progress. There were also a good number who did not manage to make a correct first step and gained 0 marks; a common error was to calculate 4×7 or 4×4.2 rather than 5×4.2. Part (b) saw little success as most students gained no marks, with common incorrect responses centring around the mean increasing or the length of the other 4 sticks being reduced.

Question 22

It was rare to see a fully correct construction and 90° angle at *P* on this question. Almost all students on this paper did not know what arcs were required. Many students did however gain 1 mark for drawing a 90° angle at *P* without the correct construction lines.

Question 23

Very few students were able to gain full marks on this question. A small number made a positive start and gained one of the first two P marks, the equations most commonly seen were $x = 2y$, $2x + y = 180$ and $y + w = 180$. Division by 3, rather than 5, of the 180° in the triangle was commonly seen. Most students understood the correct angle facts for angles in a triangle / on a straight line. Many students ignored the fact the triangle was isosceles and calculated the angles as if it was an equilateral triangle, giving 60° angles which led to $180 - 60 = 120$ as the incorrect answer. Many students attempted to assign values to x and y, these values were usually incorrect but if the correct values were seen this usually led to a correct value for w as well.

Question 24

This was another challenging multi-step question for this cohort; the majority gained 0 marks. Some were able to make a correct start and set up an equation in x, although some failed to include the x from shelf **A**. Progress from there required a correct process to solve their equation and substitute the value for x into one of the expressions for shelves **B** or **C**, any students that did this successfully often gained the 3rd P mark as well for 7500 ÷ "25". It was rare to see any students get as far as the 4th P mark but those that did usually went on to gain full marks assuming their arithmetic had been correct. There were many completely incorrect solutions seen such as expanding $(3x + 1)(2x - 5)$ or setting $3x + 1$ equal to 7500 and going from there.

Question 25

Those that knew the density, mass, volume formula generally scored 2 marks. Of those that did not gain 2 marks, most scored 0 for incorrect use of mass and volume, with the most common error being to multiply 27 and 10 instead of divide. Other incorrect methods involved trying a volume unit conversion, confusing units^3 with 10^3 and dividing 27 by 1000, and being unable to choose between m/v and $m \times v$ and stating both.

Question 26

It was common to see students gain the first method mark for rounding one of the figures appropriately, 6 or 8 on the numerator being seen most often. The majority then struggled with the next step which was to carry out an accurate calculation. Some were able to reach the digits 16, from attempting 48 ÷ 0.3 but resulting in incorrect place value. Some students attempted to work out the accurate calculation and then round the answer, gaining no marks. A few students were able to deal with the decimal value of 0.3 in the denominator by multiplying both the top and bottom of their fraction by 10. This is a useful skill for centres to continue teaching their students but in general dividing by decimals is a skill that needs more practice. Some students rounded 0.26 down to 0 which led to 48 ÷ 0 and were confused with what to do with the calculation.

Question 27

For part (a) there were many good attempts to expand the brackets but these attempts rarely resulted in credit being awarded. Common errors included $6x$ or $5x$ instead of $6x^2$ and incorrect signs being used. Those students using the grid method to expand the quadratic were usually successful at gaining at least 1 mark. In part (b) a small number of students were able to give a correct factorisation. Some students who gained B0 were able to give a pair of brackets with the product of the constants being -16, such as $(x + 2)(x - 8)$.

Summary

Based on the performance on this paper, students/centres should work on:

- measuring angles accurately.
- improving numeracy skills, including division skills for integers and decimals, multiplication skills for decimals.
- the interpretation of problems involving ratio.
- the formation of algebraic equations and solving them along with subsequent substitution to apply to problems in context.
- drawing a straight line graph by correctly calculating a table of values.
- using equilateral, isosceles and right-angled triangles to solve angle questions.
- encouraging students to show a full method for percentage calculation, noting that before method marks can be awarded a full explanation of each step has to be shown. If the answer is just stated then process marks will be lost if there are any arithmetic errors.
- encouraging students to set out their working using logical steps.
- encouraging students to read the question carefully so that they understand what they are required to do and what format the answer should be stated in.
- encouraging students to use approximations to check if their answers are sensible.
- encouraging students to set their work out in an orderly fashion.
- improving the expertise and accuracy required in geometric constructions.

and

- in questions requiring finding the prime factors of a number, encourage a more structured approach of dividing the number by the smallest prime numbers successively until the result was a prime number.
- ensure students know common metric equivalents from the specification, from one unit to another.
- practise arithmetic processes involving negative numbers.

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