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GCSE MATHS

Number

Edexcel 1MA1 | Subtopic collection Topic 03

Fractions and mixed numbers

Foundation tier

Answers and examiner comments

105	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)		0.25	1	B1 cao
	(b)		$\frac{3}{4}$	1	B1 cao
	(c)		9 squares shaded	1	B1 for any 9 squares shaded

5MB2F_01

5MB2F/01

2	(a)		9	1	B1 cao
	(b)		0.6,2.8,4.71,13.4	1	B1 cao
	(c)		0.7	1	B1 cao

Question	Working	Answer	Mark	Notes
6 (a)	$\frac{90}{360}$	$\frac{1}{4}$	1	B1 for $\frac{1}{4}$ oe or 25% or 0.25 or quarter
(b)	360 – (42 + 90 + 108) = 360 – 240 = 120 Followed by 120 ÷ 20 = $6°$ /person 90 ÷6 OR $\frac{90}{120}=\frac{3}{4}$ $\frac{3}{4}$ of 20 OR 120 = $\frac{1}{3}$ of the whole Total number = 20×3=60 $\frac{1}{4}$ of 60	15	4	M1 for 360 – (42 + 90 + 108) A1 for 120 M1 for 90 ÷ (“120” ÷ 20) A1 cao or M1 for 360 – (42 + 90 + 108) A1 for 120 M1 for $\frac{3}{4}$ of 20 A1 cao or M1 for 360 - (42+90+108) A1 for 120 M1 $\frac{1}{4}$ of 60 A1 cao

3	(a)	$\frac{12}{20}$	3/5	2	M1 for a fraction equivalent to $\frac{12}{20}$, unsimplified A1 cao [SC: B1 for $\frac{2}{5}$ if M0 scored]
	(b)		6 cells shaded	1	B1 for any 6 cells shaded

20		$\frac{\sqrt{20.4}}{6.2\times0.48}=\frac{4.5166359}{2.976}$	1.5176(868)	2	B2 for 1.5176… (B1 for sight of 4.51(66359..) **or** 4.52 **or** 2.976 **or** 2.98 **or** 1.51 **or** 1.52 **or** 1.518 **or** or 1.517 **or** 1.5177 **or** $\frac{\sqrt{510}}{5}$)

1MA0_2F

Question		Working	Answer	Mark	Notes
1	(a)		0.25	1	B1 cao
	(b)		$\frac{3}{4}$	1	B1 oe
	(c)		20	1	B1 cao

6	(a)	150 – 10 + 25 = 165 165 – 5 + 16 Or 150 – 5 + 16 = 161 161 – 10 + 25 OR 150 – 15 =135 135 + 41 Or 150 + 41 = 191 191 – 15 OR 10 + 5 = 15 25 + 16 = 41 41 – 15 = 26 150 + 26	176	3	M1 150 – 10 + 25 or 165 M1 “165” – 5 + 16 A1 cao Or M1for 150 – 5 + 16 or 161 M1 for or “161” – 10 + 25 A1 cao OR M1 150 – 10 – 5 or 150 – 15 or 135 M1 “135” + 25 + 16 or “135” + 41 A1 cao Or M1 for 150 + 25 + 16 or 150 + 41 or 191 M1 for “191” – 10 – 5 or “191” – 15 A1 cao OR M1 10 + 5 or 15 or 25 + 16 or 41 25 + 16 – 10 – 5 or 26 M1 for 150 + “41” – “15” or 150 + “26” A1 cao

5MB3F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
6	(b)	$\frac{80}{240} = \frac{1}{3}$	$\frac{1}{3}$	2	M1 $\frac{80}{240}$ oe A1 cao SC B1 for $\frac{2}{3}$

13			490	4	M1 for $\frac{1}{10} \times 700$ (= 70) M1 for $\frac{1}{5} \times 700$ (= 140) M1 (dep on M1) for 700 – ("70" + "140") A1 cao OR M1 for $\frac{1}{10} + \frac{1}{5}$ or $\frac{3}{10}$ oe M1 for $1 - \frac{3}{10}$ or $\frac{7}{10}$ or $\frac{3}{10} \times 700$ or 210 M1 (dep on M1) for "$\frac{7}{10}$"× 700 or 700 – "210" A1 cao

5MB1F_01

Question		Working	Answer	Mark	Notes
1	(a)		$\frac{1}{10}$	1	B1 for $\frac{1}{10}$ or equivalent fraction
	(b)		0.25	1	B1 for 0.25

Original question 5

The full source mark scheme begins on page 133. Use the original paper code, tier and question number shown above.

Question		Working	Answer	Mark	Notes
5			$\frac{40}{200}$	3	**(uses frequencies)** M1 for 40 or 200 or any correct day total M1 for $\frac{40}{T}$, $T > 40$ or $\frac{n}{200}$, $n < 200$ A1 for $\frac{40}{200}$ oe accept 20% OR **(uses boxes)** M1 for 2 or 10 M1 for $\frac{2}{T}$, $T > 2$ or $\frac{n}{10}$, $n < 10$ A1 for $\frac{2}{10}$ oe accept 20% OR **(uses rectangles)** M1 for 8 or 40 M1 for $\frac{8}{T}$, $T > 8$ or $\frac{n}{40}$, $n < 40$ A1 for $\frac{8}{40}$ oe accept 20% [SC B2 for 40 out of 200 oe]

12	(a)(i)		46-50	2	B1 for 46 – 50
	(ii)		$\frac{48}{360}$		B1 ft from their part (i) for their $\frac{48}{360}$, $\frac{8}{60}$, $\frac{2}{15}$ oe; do not accept decimals.
	(b)		23	3	M1 ft for 360 – (90 + "48" +" 84") [=136-140] M1 ft for 360 ÷ 60 = 6° or "138" ÷ 6 A1 cao **Or** M1 ft for 360 – (90 + "48" + "84") [=136-140] M1ft for using their 138 in $\frac{138}{360} \times 60$ (=22.5 – 23.5) A1 cao

Question		Working	Answer	Mark	Notes
4	(a)		0.5	1	B1 cao
	(b)		$\frac{3}{4}$	1	B1 for $\frac{3}{4}$ oe eg. $\frac{75}{100}$
	(c)		$\frac{19}{30}$	1	B1 for $\frac{19}{30}$

18			41.968	2	B2 for 41.968 (B1 for $\frac{5246}{125}$ **or** 32.768 **or** 9.2)

22	(a)		34.81	1	B1 cao
	(b)(i)		35.1606....	2	B1 for 35.1606(7977...)
	(ii)		35.2		B1 ft from (i) provided (i) has more than one decimal place

Original question 8

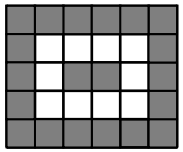
The full source mark scheme begins on page 153. Use the original paper code, tier and question number shown above.

11	(a)		0.8 drawn	1	B1 cao
	(b)	$\frac{3}{4}+\frac{3}{4}=1\frac{1}{2}$ 1.500 – 0.8 = 0.7 0.7 × 1000 OR $\frac{3}{4}+\frac{3}{4}=1\frac{1}{2}$ $1\frac{1}{2}$ kg = 1500 g 0.8 kg = 800g 1500 – 800 OR 0.8kg = 800g $\frac{3}{4}$ kg = 750g 800 – 750 = 50 750 – 50	700	4	M1 For a complete method to find the weight of two puddings M1 For a complete method to find the difference of 'weight of two puddings' and 0.8kg M1 For a complete method to convert an appropriate weight from kg to g A1 cao OR M1 For a complete method to find the difference between 0.8 kg and $\frac{3}{4}$ kg M1 For a complete method to find the difference between $\frac{3}{4}$ kg and '0.8-$\frac{3}{4}$' M1 For a complete method to convert an appropriate weight from kg to g A1 cao

PAPER: 5MB2F_01

7	(a)		0.75	1	B1 cao
	(b)		$\frac{3}{10}$	1	B1 for $\frac{3}{10}$ oe fraction

PAPER: 1MA0_1F

Question		Working	Answer	Mark	Notes
11	(a)		$\frac{7}{15}$	2	M1 for $\frac{14}{30}$ oe A1 cao
	(b)		2	1	B1 cao
	(c)			2	M1 for at least 3 of the 5 rows correct A1 cao SC if M0 scored: B1 for a symmetrical pattern with more than 6 squares shaded but not all shaded.

Original question 21

The full source mark scheme begins on page 165. Use the original paper code, tier and question number shown above.

PAPER: 5MB2F_01

Question		Working	Answer	Mark	Notes
1	(a)		Ordered	1	B1 for 399, 3007, 3333, 4011, 4435
	(b)		Ordered	1	B1 for 0.7, 3.7, 5.62, 14.3
	(c)		0.9	1	B1 cao
	(d)		$1\frac{3}{8}$	1	B1 cao

PAPER: 5MB3F_01

Question		Working	Answer	Mark	Notes
1	(a)(i)		2.67	3	B1 cao
	(ii)		4		B1 cao
	(iii)		1.8		B1 cao
	(b)		$\frac{53}{100}$	1	B1 cao
	(c)		0.6	1	B1 cao

Original question 3

The full source mark scheme begins on page 183. Use the original paper code, tier and question number shown above.

3	(a)		0.7	1	B1
	(b)		45	1	B1 cao
	(c)		$\frac{3}{10}$	2	M1 for $\frac{30}{100}$ or equivalent fraction A1 cao
	(d)		2.74	1	B1 cao

PAPER: 1MA0_2F

PAPER: 1MA0_2F

Question		Working	Answer	Mark	Notes
19			36	4	M1 for $\frac{3}{5} \times 240$ (= 144) M1 for $\frac{1}{4} \times 240$ (= 60) M1 (dep on M2) for 240 – ('144' + '60') A1 cao OR M1 for $\frac{3}{5} + \frac{1}{4}$ or $\frac{17}{20}$ oe M1 for 1 – '$\frac{17}{20}$' (= $\frac{3}{20}$) or '$\frac{17}{20}$' × 240 (= 204) M1 (dep on M2) for '$\frac{3}{20}$' × 240 or 240 – '204' A1 cao

7	(a)		Sleep	1	B1cao
	(b)		1/4	1	B1 oe
	(c)		3	2	M1 for a complete method e.g. 360 ÷ 45 and 24 ÷ '8' or 24 ÷ 8 or 24 ÷ 4 ÷ 2 or 24 ÷ 360 × 45 A1 cao

5MB1F/01 June 2015

Question	Working	Answer	Mark	Notes
3 (a)		$\frac{3}{4}$ shaded	1	B1 for 6 sectors shaded
*(b)		$\frac{1}{3}$ + correct reason	2	M1 for $1 \div 3$ (=0.33…) C1 for correct statement and 0.33(…) **OR** M1 for $\frac{3\times3}{10\times3}$ and $\frac{1\times10}{3\times10}$ C1 for correct statement and $\frac{9}{30}$ and $\frac{10}{30}$ **OR** M1 for $\frac{1\times3}{3\times3}$ C1 for correct statement and $\frac{3}{9}$ and $\frac{3}{10}$ **OR** M1 for e.g. $\frac{1}{3} \times 30$ (=10) and 0.3×30 (=9) C1 for correct statement and e.g. 10 and 9

Question	Working	Answer	Mark	Notes
5 (a)		0.25	1	B1 cao
(b)		$\frac{15}{100}$	1	B1 for $\frac{15}{100}$ oe
(c)		$\frac{17}{40}$	1	B1 for $\frac{17}{40}$ oe

Question		Working	Answer	Mark	Notes
1	(a)		0.2	1	B1 cao
	(b)		$\frac{37}{100}$	1	B1 cao
	(c)		4	1	B1 cao
	(d)		6	1	B1 for 6 or +6

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

PAPER: 1MA0/1F

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

12	(a)		$\frac{1}{4}$	1	B1 for $\frac{1}{4}$ oe, eg $\frac{90}{360}$
	(b)		19	3	M1 for method to find the angle for 15 years (= 95), if measured accept 93 – 97 M1 for correct method to find degrees per person 115 ÷ 23 (= 5) or people per degree 23 ÷ 115 ($=\frac{1}{5}$) A1 cao

7	(a)		$\frac{10}{20}$	1	B1 for fraction $\frac{10}{20}$ oe
	*(b)		$\frac{5}{7}$	3	M1 for 14 squares shaded for $\frac{2}{3}$ or for 15 squares shaded for $\frac{5}{7}$ M1 for 14 squares shaded for $\frac{2}{3}$ and 15 squares shaded for $\frac{5}{7}$ C1 for correct statement from supportive working OR M1 for method to express each fraction with a common denominator eg $\frac{2\times7}{3\times7}$ and $\frac{5\times3}{7\times3}$, at least one numerator correct. M1 for $\frac{14}{21}$ and $\frac{15}{21}$ oe C1 for correct statement from supportive working

PAPER: 5MB2F/01

Question	Working	Answer	Mark	Notes
19 (a)		$\frac{1}{6}$	1	B1 cao
(b)		4	2	M1 for 20 ÷ 5 (=4) Allow build up method to 4 lots of 1:5 A1 cao
(c)		6	2	M1 for a full method to find the number of red counters needed eg 20 ÷ 2 – "4" A1 ft from (b)

11	(a)		14 cm	2	B1 for 14 B1 for cm
	(b)		$\frac{1}{8}$	2	M1 for $\frac{7}{56}$ or 0.125 A1 cao
	(c)		three squares correctly added	1	B1 for 3 squares shaded to give a shape with one line of symmetry
	(d)		three squares correctly added	1	B1 for 3 squares shaded to give a shape with rotational symmetry of order 2

PAPER: 1MA0/2F

17	(a)		6.7	1	B1 for 6.7
	(b)		0.064	2	B2 for 0.064 (B1 for 15.625 oe or 0.4 oe)

PAPER: 1MA0/2F

8	(a) (b)		10 $\frac{40}{200}$	2 1	M1 for 8 ÷ 0.75 oe (= 10.6666..) A1 cao B1 oe

Question		Working	Answer	Mark	Notes
15	(a)		$\frac{1}{6}$	2	B2 cao (B1 for any equivalent fraction)
	(b)		75	3	M1 for method to work out degree equivalent of 1 person e.g 60 ÷ 30 (= 2) M1 for a complete method to work out number of women e.g. (360 − 60 − 60 − 90) ÷ "2" oe A1 cao **or** M1 for complete method to work out angle of women sector eg 360 − 60 − 60 − 90 (= 150) M1 for a complete method to work out number of women e.g ("150" ÷ 60) × 30 oe A1 cao
	(c)		Can't tell or No (supported)	1	B1 for a convincing reason e.g. there is no information about the population size this week

4		$\frac{11}{30}, \frac{2}{5}, \frac{7}{15}, \frac{1}{2}$	M1 A1	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 correct order

Paper 1MA1: 2F

4		40	M1 A1	for 32 ÷ 4 (= 8) or 32 × 5 (= 160) or complete method eg 32 ÷ 4 × 5 oe (= 40) cao

14		$\frac{5}{7}$	P1	for $\frac{7}{5} = 1.4$ **or** $\frac{5}{7} = 0.7..$ **or** compares $\frac{1}{7}$ to $\frac{1}{5}$ **or** compare $\frac{5}{7}$ to 1 eg $1-\frac{5}{7}$ $(=\frac{2}{7})$ **or** compare $\frac{7}{5}$ to 1 eg $\frac{7}{5} = 1\frac{2}{5}$ **or** eg $\frac{49}{35}$ **or** $\frac{14}{35}$ **or** $\frac{25}{35}$ oe
		supported	P1	for $\frac{7}{5} = 1.4$ and $\frac{5}{7} = 0.7..$ **or** compares $\frac{5}{7}$ to 1 eg $1-\frac{5}{7}$ $(=\frac{2}{7})$ and $\frac{7}{5}$ to 1 eg $\frac{7}{5} = 1\frac{2}{5}$ **or** two correct fractions with common denominator eg $\frac{49}{35}$ and $\frac{25}{35}$
			C1	for $\frac{5}{7}$ with supporting evidence

Question	Working	Answer	Mark	Notes
26		Daisy is wrong	P1	for process to find area of any relevant circle ie $\pi\times4^2$ (=16π), $\pi\times7^2$ (=49π), $\pi\times10^2$ (=100π) **or** 7^2 and 4^2
		(supported)	P1	for completed method to find shaded area eg "$\pi\times7^2$" – "$\pi\times4^2$" (=33π) **or** use of radii eg $7^2 - 4^2$ (=33)
			A1	for 2 comparable figures, eg 33π and 100π **or** 33 and 100 **or** 103 to 103.7 and 314 to 314.2 **or** 103 to 103.7 and 104.6 to 104.8
			C1	statement eg No because it should be $\frac{33}{100}$ and their accurate figures Allow use of π = 3 or better

Question	Working	Answer	Mark	Notes
1		0.07	B1	cao

Question	Working	Answer	Mark	Notes
5 (a)		$\frac{33}{60}$	M1	for method to find number of students who did not walk to school eg 15 + 12 + 6 or 60 – 27 (=33) or 0.55 or for $1-\frac{27}{60}$
			A1	for $\frac{33}{60}$ or equivalent fraction
(b)		Pie chart drawn	M1	for method to find the angle for at least one sector eg $\frac{27}{60}\times 360$, $\frac{12}{60}\times 360$, $\frac{6}{60}\times 360$, $27\div\frac{60}{360}$, $12\div\frac{60}{360}$, $6\div\frac{60}{360}$ oe (0.166..) NB: could be implied by one angle drawn accurately.
			M1	for drawing at least one sector accurately (from 4 sectors) eg 162°or 72°or 36°
			A1	for an accurately drawn pie chart
			B1	(dep on 4 sectors with at least one accurately drawn) for showing labels Walk Car Bicycle

6 (a)		$\frac{3}{7}$	B1	for $\frac{3}{7}$ or equivalent fraction
(b)		3 : 1	B1	for 3 : 1 or equivalent ratio

Paper: 1MA1/2F

23	(a)		0.625	B1	cao
	(b)		$9.75 \leq x < 9.85$	B2 [B1	$9.75 \leq x < 9.85$ for 9.75 **or** 9.85 (or $9.84\dot{9}$)]

Paper: 1MA1/3F

4	$\frac{3}{9}$	B1	for $\frac{3}{9}$ accept $\frac{1}{3}$	

19 (a)	$\frac{95}{28}$	M1	for a method to add using common denominators with at least one fraction correct (matching numerator with common denominator) eg $\frac{60}{28}+\frac{35}{28}$ **or** $(2)\frac{4}{28}+(1)\frac{7}{28}$	Use of decimals gets no credit unless it leads to a correct fraction
		A1	$\frac{95}{28}$ oe eg $3\frac{11}{28}$	
(b)	$1\frac{3}{5}$	M1	for $\frac{6}{5}\times\frac{4}{3}$ **or** $\frac{24}{20}\div\frac{15}{20}$ **or** $\frac{8}{5}$ oe eg $1\frac{9}{15}$	Use of decimals gets no credit unless it leads to a correct fraction
		A1	cao	

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
1	0.9	B1	cao	Accept with trailing 0s eg 0.90

11	$\frac{40}{560}$ oe	M1 A1	for correct start to method eg 600 – 560 (= 40) **or** $\frac{600}{560}$ oe (= 1.07(14…)) **OR** correct answer but not a fraction eg 0.07(14…) for any equivalent fraction to $\frac{40}{560}$ eg $\frac{1}{14}$	

11	(a)	$\frac{10}{16}$	B1	cao	
	(b)	$\frac{11}{12}$	M1	for $\frac{10}{12}$ **OR** for using a suitable common denominator other than 12 with at least one of the two fractions correct, eg $\frac{2}{24} + \frac{20}{24}$	
			A1	for $\frac{11}{12}$ oe	Accept any equivalent fraction

Paper: 1MA1/1F

5	$\frac{31}{100}$	B1	cao	

6	$\frac{5}{7}, \frac{11}{15}, \frac{3}{4}, \frac{19}{25}$	M1 A1	conversion into decimals or percentages or other equivalent form, at least two conversions correct, **or** any three fractions in correct order cao	0.71(...), 0.73(...), 0.75, 0.76 Accept list in reverse order for this mark Accept expressed in equivalent decimals or percentages or any other appropriate form

Paper: 1MA1/3F

Question	Answer	Mark	Mark scheme	Additional guidance
1 (i)	43.7	B1	cao	
(ii)	$\frac{5}{7}$	B1	$\frac{5}{7}$ oe	Accept any other equivalent fraction to $\frac{5}{7}$

8	$\frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{7}{12}, \frac{3}{4}$	M1 A1	converts fractions to a common equivalent form, at least two conversions correct eg fractions with a denominator of 12, decimals or percentages, **or** any 4 fractions in correct order cao	0.25, 0.33(…), 0.5, 0.58(…), 0.75 Accept list in reverse order for this mark Accept expressed in equivalent decimals or percentages or any other appropriate from or mixed forms

Question	Answer	Mark	Mark scheme	Additional guidance
14 (a)	14	B1	for 14	
(b)	Explanation	C1	for explanation **Acceptable examples** she divided by 2 but should have multiplied by 2 there are 96 halves in 48 $48 \times 2 = 96$ **Not acceptable examples** $24 \times 2 = 48$	

Question	Answer	Mark	Mark scheme	Additional guidance
19 (a)	$\frac{7}{15}$	M1	for suitable common denominator with at least one fraction out of two correct, eg $\frac{10}{15} - \frac{3}{15}$ oe	
		A1	oe	
(b)	$\frac{1}{2}$	M1	for method to multiply fractions, eg $\frac{2\times3}{3\times4}$, $\frac{8\times9}{12\times12}$ **or** to simplify, $\frac{1}{3}\times\frac{3}{2}$ or $\frac{2}{1}\times\frac{1}{4}$ **OR** for an answer equivalent to $\frac{1}{2}$ (unsimplified) eg $\frac{2}{4}$, 0.5	
		A1	cao	

Question	Answer	Mark	Mark scheme	Additional guidance
1	$\frac{3}{4}$	B1	for $\frac{3}{4}$ or any other equivalent fraction	

10	$\frac{3}{5}$	M1 M1 A1	for a start in the method eg 35 + 50 + 75 (= 160) **or** 400 – 35 – 50 – 75 (= 240) or $\frac{160}{400}$ oe for eg $\frac{400-"160"}{400}$ or $\frac{2}{5}$ or $1-\frac{160}{400}$ **or** for an unsimplified answer eg $\frac{"240"}{400}$ oe or as 60% oe cao	

Question	Answer	Mark	Mark scheme	Additional guidance
12	$\frac{9}{25}$	M1	for $\frac{n}{6+9+10}$ where n is an integer < 25	
		A1	for $\frac{9}{25}$	Or equivalent fraction

14	2.4774(011…)	M1	for 8.77 or 3.54 or 2.477 or 2.47 or 2.48 or $\frac{877}{354}$	
		A1	for 2.4774(011…)	If the answer has been rounded to less than 4 dp but the figure is shown in working to 4 dp or more, award full marks. Ignore any incorrect digits after the 4th decimal place.

Paper: 1MA1/3F

4	$\frac{2}{5}$	B1	cao	

22	$2\frac{1}{3}$	M1 M1 A1	for either $\frac{7}{4}$ oe or $\frac{4}{3}$ oe for method to find the product, eg $\frac{7\times4}{4\times3}$ or $\frac{21\times16}{12\times12}$ oe or for $\frac{28}{12}$ or $\frac{7}{3}$ oe for $2\frac{1}{3}$ or an equivalent mixed number	

7	$\frac{13}{20}$	M1 A1	for 20 – 7 (= 13) **or** $\frac{7}{20}$ oe **or** 0.65 **or** 65% for $\frac{13}{20}$ or equivalent fraction	

12	0.35	P1 A1	for $\left(\frac{1}{10}+\frac{3}{5}\right)\div 2$ **or** 0.1 **and** 0.6 **or** 10(%) **and** 60(%) **or** 35(%) **or** for converting to equivalent fractions with a common denominator eg $\frac{1}{10}$ **and** $\frac{6}{10}$ for $\frac{7}{20}$ oe **or** 0.35	

Paper: 1MA1/2F

2	10	B1	cao	

3	$\frac{7}{10}$	B1	for $\frac{7}{10}$ or for any other equivalent fraction	Eg $\frac{70}{100}$

4	0.75	B1	cao	

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
9 (a)	$\frac{3}{7}$	B1	oe	
(b)	1 : 2.5	M1	for appropriate method shown eg 30 ÷ 12 (= 2.5) **or** for a method that involves simplification of 12 : 30 approaching 1 : *n* , eg. 4 : 10 or 6 : 15 or 2 : 5 **or** for 2.5 : 1 or $2\frac{1}{2}$: 1	
		A1	for 1 : 2.5 or 1 : $2\frac{1}{2}$ **or** for *n* = 2.5	Accept a fraction equivalent to $2\frac{1}{2}$, eg. 1 : $\frac{30}{12}$ 2.5 alone gets M1A0

10	660	P1 P1 P1 A1	for a process to work out the **number** of large marbles eg 12 ÷ 4 (=3) **or** the **number** of small marbles eg 12 – [number of large marbles] **or** 12 × (1− ¼) (=9) (dep) for a process to work out the **weight** of large marbles eg "3" × 70 (=210) **or** to work out the **weight** of small marbles eg "9" × 50 (=450) for a complete process eg (12÷4) × 70 + 12 × (1− ¼) × 50 oe cao	[number of large marbles] could come from an incorrect method for finding $\frac{1}{4}$ of 12

21	Shown	M1 M1 C1	for conversion to improper fractions eg. $\frac{7}{3}$ **or** $\frac{15}{4}$ (dep) for method to multiply fractions, eg. $\frac{7\times15}{3\times4}\left(=\frac{105}{12}\right)$ **or** $\frac{28\times45}{12\times12}\left(=\frac{1260}{144}\right)$ oe for complete working showing each stage as far as $\frac{35}{4}$ or $8\frac{9}{12}$	Need not be shown with operators

Paper: 1MA1/2F

Question	Answer	Mark	Mark scheme	Additional guidance
1	$\frac{37}{100}$	B1	or any other equivalent fraction	

Paper: 1MA1/2F

Question	Answer	Mark	Mark scheme	Additional guidance
19	$\frac{3}{10}$	P1	for a process to find three amounts in the correct proportions, eg R = 1, L = 3 × 1 = 3, A = 2 × 3 = 6, **or** R : L : A = $\frac{1}{6}$: 0.5 : 1 oe **or** $L=3R$, $L=\frac{A}{2}$ or $L=3R$, $2L=A$	Relationship could be given in algebraic form or in ratio form, using fractional comparison or using their own figures
		A1	for $\frac{3}{10}$ or equivalent fraction	Award P1 for correct answer not given as a fraction

7	$\frac{3}{4}$	M1 A1	for method to find fraction shaded, eg 12 out of 16 squares shaded or unsimplified answer eg $\frac{12}{16}$ **or** for $1-\frac{1}{4}$ oe or for an answer of $\frac{1}{4}$ cao	May be expressed in a wide variety of ways.

3	0.09	B1	cao	Accept an answer of .09

22	$1\frac{8}{15}$	M2	for a complete method, eg $4 - 2 + \frac{3}{15} - \frac{10}{15}$ condoning error with one numerator **or** for $\frac{21}{5} - \frac{8}{3} = \frac{63}{15} - \frac{40}{15} (= \frac{23}{15})$ with no more than one error	
		(M1	for finding two fractions with a correct common denominator, with at least one correct corresponding numerator, eg $\frac{3}{15}, \frac{10}{15}$ **or** for converting both to improper fractions, eg $\frac{21}{5}, \frac{8}{3}$)	At least one improper fraction must be correct
		A1	$1\frac{8}{15}$ oe	Any equivalents must be a mixed number

Paper: 1MA1/1F

10	$\frac{17}{30}$	B1	for $\frac{17}{30}$ or any equivalent fraction	

15	$\frac{4}{9}, \frac{3}{5}, \frac{5}{8}, \frac{2}{3}$	M1 A1	converts into decimals or percentages or equivalent fractions, at least 2 conversions correct **or** for any 3 fractions in correct order for $\frac{4}{9}, \frac{3}{5}, \frac{5}{8}, \frac{2}{3}$	0.44(...), 0.6, 0.625, 0.66(...) Accept in reverse order for this mark Accept expressed in equivalent decimals or percentages or fractions or in mixed numerical form

Paper: 1MA1/2F

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
12 (a)	$\frac{7}{12}$	M1	for finding two fractions with a correct common denominator, with at least one correct corresponding numerator, eg. $\frac{5}{12}$, $\frac{2}{12}$	
		A1	for $\frac{7}{12}$ oe eg $\frac{14}{24}$, $\frac{21}{36}$, $\frac{28}{48}$, $\frac{35}{60}$, $\frac{42}{72}$, …….	Ignore errors in cancelling following sight of an equivalent fraction to $\frac{7}{12}$
(b)	$\frac{3}{16}$	M1	for method to multiply fractions, eg $\frac{3\times5}{10\times8}$ $(=\frac{15}{80})$ **or** simplifies the calculation eg $\frac{3}{2}\times\frac{1}{8}$ **or** for an answer equivalent to $\frac{3}{16}$ unsimplified	
		A1	cao	

Question	Answer	Mark	Mark scheme	Additional guidance
20	$\frac{39}{88}$	M1	for finding the gap (A) $1-\frac{5}{8}$ $(=\frac{3}{8}=\frac{33}{88})$ **or** (C) $1-\frac{9}{11}$ $(=\frac{2}{11}=\frac{16}{88})$ **or** $\frac{5}{8}+\frac{9}{11}$ $(=\frac{55}{88}+\frac{72}{88}=\frac{127}{88})$	
		M1	for $\frac{9}{11}-\frac{3}{8}(=\frac{72}{88}-"\frac{33}{88}")$ **or** $\frac{5}{8}-\frac{2}{11}$ $(=\frac{55}{88}-"\frac{16}{88}")$ **or** $1-\frac{3}{8}-\frac{2}{11}(=1-"\frac{33}{88}"-"\frac{16}{88}")$ oe **or** $\frac{5}{8}+\frac{9}{11}-1$ $(=\frac{55}{88}+\frac{72}{88}-1)$	
		A1	oe	

2	$\frac{7}{10}$	B1	oe fraction	

14	(i)	>	B1	cao	
	(ii)	=	B1	cao	

12	$\frac{3}{50}$	M1 A1	for $\frac{60}{1000}$ or equivalent fraction cao	

Question	Answer	Mark	Mark scheme	Additional guidance
1	$\frac{3}{10}$	B1	for $\frac{3}{10}$ oe	Accept equivalent fractions, eg $\frac{30}{100}$

20 (a)	$3\frac{17}{20}$	M1	for finding two fractions with a correct common denominator (multiple of 20), with at least one correct corresponding numerator, eg. $\frac{12}{20}$, $\frac{5}{20}$ or $\frac{32}{20}$, $\frac{45}{20}$	May be from $\frac{3}{5}$ and $\frac{1}{4}$ or from $\frac{8}{5}$ and $\frac{9}{4}$
		A1	for $3\frac{17}{20}$ or an equivalent mixed number SC: B1 for 3.85 if M0 scored	
(b)	shown	M1	for $\frac{8}{3} \times \frac{1}{6}$ oe or $\frac{4}{9} \times \frac{6}{1}$ oe or $\frac{8}{3} \times \frac{9}{4}$ oe	
		A1	for unsimplified fraction which could lead to $\frac{4}{9}$, eg $\frac{8}{18}$ or for $\frac{4}{3} \times \frac{1}{3}$ or $\frac{24}{9} \div 6$ **or** for unsimplified fraction which could lead to $2\frac{2}{3}$, eg $\frac{24}{9}$ **or** for unsimplified fraction which could lead to 6, eg $\frac{72}{12}$	

Question	Answer	Mark	Mark scheme	Additional guidance
24 (a)(i)	2 : 6 : 5	P1	for process to compare ratios, eg $a : b = 2 : 6$ or $b : c = 3 : 2.5$	Could use 3 or any common multiple of 3 and 6
		A1	for 2 : 6 : 5 oe	
(ii)	$\frac{2}{13}$	M1	for process to find fraction, eg $\frac{[2]}{[2+6+5]}$ or for $\frac{a}{a+b+c}$	
		A1	for $\frac{2}{13}$ oe or ft (a)(i)	
(b)	1 : 10	P1	for process to express all numbers in terms of one number, eg $p = 5 \times 2m$ (= $10m$) or $m = \frac{n}{2}$ **or** for $2m = \frac{p}{5}$ **or** for assigning values in the ratio given, eg $m = 1$, $n = 2$, $p = 10$ **or** for $n : m : p = 2 : 1 : 10$ oe **or** 10 : 1 oe	
		A1	for 1 : 10 oe	

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
12 (a)	82.5	M1	for a complete method, eg $132 \div 8 \times 5$	$132 - 82.5$ (= 49.5) M1 implied
		A1	cao	
(b)	$\frac{1}{4}, \frac{9}{32}, \frac{21}{64}, \frac{3}{8}$	M1	converts into decimals or percentages or equivalent fractions, at least 2 conversions correct **or** for any 3 fractions in correct order	0.25, 0.28(125), 0.32(8125), 0.37(5)
		A1	cao	Accept in reverse order for this mark Accept expressed in equivalent decimals or percentages or fractions or in mixed numerical form

3	0.8	B1	cao	

17	(a)	87 600	B1	cao	
	(b)	13.524	M1	for 33.81 or 2.5 or $\frac{3381}{250}$ or digits 13524	
			A1	cao	

2	$\frac{3}{10}$	B1	or any equivalent fraction	3 : 10 or 0.3 or 30% get no marks

Question	Answer	Mark	Mark scheme	Additional guidance
15	$\frac{5}{14}$	M1	for method to multiply fractions, eg $\frac{6\times5}{7\times12}$ **or** to simplify, eg $\frac{1}{7}\times\frac{5}{2}$ **OR** for a fractional answer equivalent to $\frac{5}{14}$	$\frac{30}{84}, \frac{15}{42}, \frac{10}{28}$
		A1	cao	

Question	Answer	Mark	Mark scheme	Additional guidance
21	$4\frac{7}{8}$	M2	for a complete method, eg $7-2+\frac{3}{8}-\frac{4}{8}$ condoning error with one numerator **or** for $\frac{59}{8}-\frac{5}{2}=\frac{59}{8}-\frac{20}{8}$ $(=\frac{39}{8})$ with no more than one error **OR** for an answer of 4.875	
		(M1	for finding two fractions with a correct common denominator, with at least one correct corresponding numerator, eg $\frac{3}{8}, \frac{4}{8}$ **or** for converting both to improper fractions, eg $\frac{59}{8}, \frac{5}{2}$ **OR** for 7.375 – 2.5)	At least one improper fraction must be correct Both decimals must be correct
		A1	for $4\frac{7}{8}$ oe eg $4\frac{14}{16}$	Any equivalents must be a mixed number

2	$\frac{7}{10}$	B1	or any equivalent fraction	

17	$3\frac{3}{5}$	M1 M1 A1	for inverting to give $\frac{3}{5}\times 6$ oe **OR** for two correct fractions with a common denominator eg $\frac{18}{30}\div\frac{5}{30}$ for method to calculate eg $\frac{3\times 6}{5}$ or $\frac{3\times 30}{5\times 5}$ or $\frac{18}{5}$ or $\frac{90}{25}$ oe for $3\frac{3}{5}$ or any other equivalent mixed number eg $3\frac{15}{25}$	

Paper: 1MA1/1F

2	$\frac{9}{10}$	B1	oe	

18 (a)	1.882(0861678…)	B2 (B1	1.882(0861678…) for 16.6 **or** 8.82 **or** $\frac{830}{441}$ **or** 1.88)	Condone $1.\dot{8}82(0861668...)$ for both marks
(b)	1.88	B1	for 1.88 **or** ft their answer to part (a) correctly rounded to 2 dp, providing part (a) has at least 3 dp	Condone $1.\dot{8}8$ Do not accept trailing 0, eg 1.880

4	$\frac{6}{21}$	B1	eg $\frac{2}{7}$ or any equivalent fraction	

11	$\frac{7}{25}$	M1 A1	for $\frac{n}{2+16+7}$ where n is an integer < 25 cao	

Paper: 1MA1/3F

3	0.31	B1	cao	Accept .31

5	$\frac{1}{4}$ $\frac{1}{2}$ $\frac{2}{3}$	B1	for correct order	Accept any form Accept 0.6 or 0.66 or 0.67 or 0.7 or 60% or 66% or 67% or 70% or better for $\frac{2}{3}$

Question	Answer	Mark	Mark scheme	Additional guidance
9 (a)	bar at 11 for cricket	M1	for reading from graph of 12 **or** 17	
		M1	(dep) for 40 – ([12]+[17]) (=11)	Where [12] and [17] are their attempt at reading from the graph. May be implied by bar of height 40 – ([12]+[17])
		C1	for bar drawn at 11 for cricket	Condone bar of different width to those given or freehand bar. Shading not required. Bar of height 11 drawn implies M1M1C1
(b)	$\frac{3}{10}$	M1	for $\frac{12}{40}$ or $\frac{6}{20}$	Accept other equivalent fractions. Do not accept equivalent decimals or percentages
		A1	cao	
(c)	$\frac{5}{9}$	B1	for $\frac{5}{9}$ or equivalent fraction	
(d)	1.25 : 1	B1	for 1.25 : 1 or $\frac{5}{4}$: 1 or $1\frac{1}{4}$: 1	Accept $n = 1.25$ Do not accept 1.25 alone or n : 1.25

Question	Answer	Mark	Mark scheme	Additional guidance
20 (a)	$2\frac{1}{3}$	M1	for a method to subtract by writing both fractions with a common denominator with at least one correct numerator, eg. $3\frac{3}{6}-1\frac{1}{6}$ **or** $\frac{3}{6}-\frac{1}{6}\left(=\frac{2}{6}\right)$ **or** $\frac{21}{6}-\frac{7}{6}\left(=\frac{14}{6}\right)$ **or** $\frac{42}{12}-\frac{14}{12}\left(=\frac{28}{12}\right)$	
		A1	for $2\frac{1}{3}$ or an equivalent mixed number	Do not ISW incorrect further work from correct equivalent mixed number
(b)	Shown	M1	for conversion to improper fractions, eg. $\frac{21}{4}$ **or** $\frac{7}{3}$ **or** $\frac{9}{4}$	
		M1	(dep) for method to divide by a fraction, eg. $\frac{21}{4}\times\frac{3}{7}$ **or** $\frac{63}{12}\div\frac{28}{12}$	
		C1	for complete work showing each stage as far as $\frac{9}{4}$ **or** $2\frac{7}{28}$	Must see an intermediate step, eg $\frac{63}{28}$ must be seen and then cancelled or correct cancelling seen before multiplication

Paper: 1MA1/1F

2	0.75	B1	cao	

4	$\frac{4}{10}$	B1	oe eg $\frac{2}{5}$, 0.4, 40%	Accept $\frac{4}{10}$ positively indicated in the list (as long as answer line is blank)

20	(a)	0.265(0780261)	M1	for 12.57 **or** 47.42 **or** 0.2 **or** 0.26 **or** 0.27 **or** 0.3 **or** $\frac{1257}{4742}$ oe	
			A1	for 0.265(0780261)	Answer must be given to at least 3 decimal places rounded or truncated Check first 3 decimal places only
	(b)	0.27	B1	for 0.27 or ft from part (a) provided answer to (a) has at least 3 sf	

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

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

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

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)

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

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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

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)

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)

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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})

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

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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 $(x - 6)x$

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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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.

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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 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.

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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).
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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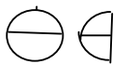
PAPER: 5MB1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		24	1	B1 cao
	(b)		22	2	M1 for 8 + 8 + 6 oe or "24" − 2 A1 cao
	(c)			1	B1 for drawing a circle showing 4 quadrants and a semicircle showing 2 sectors
2	(a)		evens	1	B1 cao
	(b)		unlikely	1	B1 cao
	(c)		1 marked	1	B1 for cross 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)

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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.

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:			
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)

Summer 2014

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

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PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		French	1	B1 cao
	(b)		Ella	1	B1 cao
	(c)		Penny	1	B1 cao
2	(a)		Line drawn	1	B1 for line length 10 cm drawn
	(b)		Midpoint marked	1	B1 for midpoint of line marked
	(c)		Radius drawn	1	B1 radius shown
	(d)		75	1	B1 for answer in the range 73 – 77
3			3.25	3	M1 for $2 \times 9.25 + 9.50 + 10.55 + 4 \times 4.55$ (= 56.75) or at least one of each item added M1(dep) for $3 \times 20 -$ "56.75" A1 cao (SC B2 for answer 26.15) (SC B1 for answer of 13.85 or 36.75)
4			3.25	1	B1 for 3.25 oe
5	(a)		28 600	1	B1 cao
	(b)		20 000	1	B1 cao
	(c)		22 950	1	B1 cao

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
6		(D, A) (J, A) (W, A) (D, M) (J, M) (W, M)	list of 6 combinations	2	B2 for six correct and distinct pairs (B1 for at least 3 pairs and no incorrect pairs or all correct pairs with repeats)
7	(a)		C and D	1	B1 cao
	(b)(i)		F	2	B1 cao
	(b)(ii)		2		B1 cao
8	(a)		27	2	M1 for a complete method to find the number of extra squares, e.g. by drawing a square of side 6 cm and attempt to find the number of extra squares or for $6^2 - 3^2$ or 3×9 or $4 \times 9 - 9$ A1 cao
	(b)		49	2	M1 for pattern 7 drawn or $(1 + 3 + 5) + 7 + 9 + 11 + 13$ or 40 or 7^2 or a list of square numbers up to 36 A1 cao
9			4.80	3	M1 for 3.50×12 (= 42) M1 for "42" − 37.20 A1 for 4.8(0) **OR** M1 for $37.20 \div 12$ (= 3.10) M1 for (3.50 − "3.10") × 12 A1 for 4.8(0) **Or** M1 for $37.20 \div 12$ (= 3.10) M1 for 3.50 − "3.10" A1 for 0.4(0) or 40p

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
10			13	2	M1 for ordering the 9 numbers or for indicating the middle number A1 cao
11	(a)		Kite drawn	1	B1
	(b)		Rectangle drawn with perimeter 14 cm	2	M1 for rectangle drawn or any shape with perimeter 14 cm A1 for a rectangle with perimeter 14 cm
	(c)		2 lines of symmetry drawn	2	B1 for horizontal or vertical line of symmetry B1 for horizontal and vertical line of symmetry and no extra lines
12	(a)		126, 21	3	B1 for 126 (seats) M1 for method identified to divide number of people by 6, ie "126" ÷ 6 or 84 ÷ 6 (= 14) or 42 ÷ 6 (=7) A1 for 21 (tables)
	(b)		Yes with £483	3	M1 for 84 × 4.5(0) (= 378) or 42 × 2.5(0) (= 105) M1 for 84 × 4.5(0) + 42 × 2.5(0) or "378" + "105" A1 for e.g. yes **and** (£)483 **or** yes **with** (£)17 left
13			15, 4.5	3	B1 for 15 M1 for (23 − 5) ÷ 4 A1 for 4.5 **N.B**. Answer can be either way round
14	(a)(i)		9	2	B1 cao
	(ii)		5		B1 cao
	(b)		*P* marked	1	B1 cao [P top left corner]

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
15	(a)(i)		2 or 3	2	B1 cao
	(ii)		12 or 24		B1 cao
	(b)		correct explanation	1	B1 for explanation eg "2 is prime"
16	(a)		(1, 4)	1	B1 cao
	(b)		cross at (−3, 2)	1	B1 for cross at (−3, 2)
	(c)		$x = 3$	1	B1 cao
17	(a)		30	1	B1 cao
	(b)		63	2	M1 for [(4 × 0)] + (5 × 1) + (10 × 2) + (7 × 3) + (3 × 4) + (1 × 5) Or [0] + 5 + 20 + 21 + 12 + 5 condone one error or omission or for 67 given as total A1 cao
	(c)		2.1	2	M1 for an attempt to divide the number of customers by the number of tables A1 for 2.1 or ft from (a) and (b)
18	(a)		2600	1	B1 for 2600
	*(b)	£100 1300 rand 3700 rand £285 Computer 4680 rand Watch 5200 rand Camera 4875 rand	computer, camera	3	M1 for method to convert 3700 rand into £ or for changing one amount in pounds into rand M1for a complete method to compare total money Simon has with the cost of each item C1 (dep M2) for correct conclusion with correct figures e.g.£383 - £386 or 4950 rand to 5050 rand

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PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
19			Data collection sheet	3	B1 for labels (e.g. transport type) or transport types listed (minimum 2) B1 for tallies or tallies shown in table B1 for frequency (or total) o.e. **NB do not accept questionnaires or graphical approaches**
20			237 600	4	M1 for one multiplication involving two numbers from (1500 or 8 or 60) **or** 90 000 or 480 or 12 000 given M1 for 1500 × 8 × 60 (= 720 000) M1 for multiplying their number of cans by 330 **and** dividing by 1000 A1 cao **Note** these operations can be applied in any order **SC** B2 if M0 scored for digits 2376

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
*21			$\frac{2}{3}$	3	M1 for attempting to write at least two fractions expressed with a common denominator with at least one of the two fractions correct A1 for three correct fractions with suitable common denominator C1 (dep M1) for correct conclusion from comparison of their three **OR** M1 for writing at least two of the fractions as decimals ie $\frac{2}{3}$ as 0.66(…) or 66(.6…)%, $\frac{7}{8}$ as 0.87(5) or 87.(5)%, $\frac{3}{4}$ as 0.75 or 75% A1 for three correct decimals or percentages C1 (dep M1) for correct conclusion from comparison of their three **OR** M1 for finding two fractions of the same number e.g. $\frac{2}{3}$ of 48 or $\frac{7}{8}$ of 48 (may be implied by shading a fraction of a rectangle divided into e.g. 48 parts) A1 for three correct values or three correct diagrams with shading C1 (dep M1) for correct conclusion from comparison of their three **OR** M1 for attempting to find the difference between $\frac{3}{4}$ and $\frac{2}{3}$ **and** between $\frac{3}{4}$ and $\frac{7}{8}$ at least one pair of fractions expressed with a suitable common denominator and at least one of the two fractions correct A1 for $\frac{1}{12}$ and $\frac{1}{8}$ or 0.08(333...) and 0.12(5) C1 (dep M1) for correct conclusion from comparison of the 2 differences.

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
22			Graph completed	2	B1 for line from (2.5, 45) to (3.5, 45) B1 ft line of correct gradient to axis (after 1½ hour)
23	(a)		92.3521	1	B1 cao
	(b)		p^6	1	B1 cao
	(c)		t^5	1	B1 cao
	(d)		6	1	B1 cao
*24			Tuesday and Friday	3	M1 for 179 ÷ 12 or 162 ÷ 12 or 170 ÷ 12 or 143 ÷ 12 A1 for 14.9(166…) or 15 and 13.5 or 14 and 14.1(66…) or 15 and 11.9(16…) or 12 C1 (dep M1) ft for comparison of their results for all the days with the number of teachers available leading to a correct statement **Or** M1 for 179 ÷ 15 or 162 ÷ 13 or 170 ÷ 14 or 143 ÷ 12 A1 for 11.9(3…) or 12 and 12.4(6…) or 13 and 12.1(4…) or 13 and 11.9(1…) or 12 C1 (dep M1) ft for comparison of their results for all the days with 12 leading to a correct statement **Or** M1 for 15 × 12 or 13 × 12 or 14 × 12 or 12 × 12 A1 for 180 and 156 and 168 and 144 C1 (dep M1) ft for comparison of their results for all the days with the number of students taking part leading to a correct statement

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PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
25	(a)		Points plotted	1	B1 for points plotted at (12, 6) and (13, 2)
	(b)		Description	1	B1 for description; e.g. as the temperature goes up the number of units of gas used goes down oe accept negative correlation.
	(c)		5 – 7	2	M1 for use of graph e.g. a single straight line segment with negative gradient that could be used as a line of best fit **or** an indication on the diagram from 12 on the *y* axis. A1 for 5 – 7
26	(a)		⅔	2	M1 for intention to subtract 4 from both sides or divide each term by 3 or $3p = 2$ written in the workspace A1 for ⅔ accept answer to two decimal places rounded or truncated
	(b)		−4, −3, −2, −1, 0	2	B2 for all 5 correct values; ignore repeats, any order (B1 for 4 correct (and no incorrect) values or all five correct values and –5)
27			2.064(285714…)	2	M1 for substitution of 0.7 into expression or 2.89 or 2.06 seen A1 for 2.064(285714…) or $\frac{289}{140}$
28			$5\frac{2}{3}$	4	M1 for $AB = 2x$ or $DC = 2x + 4$ or for $38 - 4$ (= 34) M1(dep) for $x + x +$ '$2x$'+ '$2x + 4$' or for "38 – 4" ÷ 6 M1 for '$6x + 4$' = 38 A1 for $5\frac{2}{3}$ oe **N.B.** Accept answers in the range 5.6 to 5.7 if M3 scored **SC** if M0 then B2 for an answer in the range 5.6 to 5.7

PAPER: 1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
29	(a)		40	3	M1 for $32^2 + 24^2$ M1 for $\sqrt{1600}$ or $\sqrt{(32^2 + 24^2)}$ A1 cao
	(b)		22.72	4	M1 for use of $\pi \times 60$ oe M1 for method to calculate perimeter of triangle, eg $2 \times$ '40' + 48 (=128) M1(dep M2) for complete method to find total length of strip for both mirrors or to find the cost of strip for one mirror, eg $2 \times$ £5.68 A1 for £22.72 from correct working

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**
Q02	(c)	Circle enlarged	Standard mark scheme
Q02	(d)	Angle arms lengthened. Angle *m* = 75 degrees	Standard mark scheme
Q07		Triangle D rotated 90 degrees clockwise and moved down 1 square. Triangle E moved down 1 square. Triangle F moved so that the right angle is bottom left	Standard mark scheme
Q08		unit' used instead of 'cm', image named shape X, enlargement drawn on grid and named shape Y. Wording changed: "Look at the diagram for Question 8(a) in the Diagram Book. It shows a square grid. Two shaded shapes are drawn on the grid: shape X and shape Y. Shape X is a square made from nine squares. How many MORE squares must be added to shape X to make shape Y?"	Standard mark scheme

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PAPER: 1MA0_2F			
Question		**Modification**	**Notes**
Q11	(a)	Kite drawn on grid. Asked for mathematical name for the quadrilateral.	B1 for kite
	(b)	2cm grid. Wording added to text of question "Each square represents a one centimetre square."	Standard mark scheme
	(c)	Height of top and bottom vertices of hexagon increased. Size of whole enlarged.	Standard mark scheme
Q13		Diagram rotated 90 degrees clockwise.	Standard mark scheme
Q14		Part (b) removed, Part (iii) added to (a) and reads "For this prism, write down the number of vertices."	B1 for 6 cao
Q15	(a)	'nine' inserted before 'numbers'	Standard mark scheme
Q16		2cm grid. Line L thick and dashed. At S cross changed to black circle.	Standard mark scheme
Q17		Frequency column widened to allow for working out	Standard mark scheme
Q18		1½ cm grid. Right axis labelled	Standard mark scheme
	(b)	3700 changed to 3600	Ft changes into working
Q22		2cm grid. Right axis labelled	Standard mark scheme
Q24		2cm grid. Right axis labelled. Crosses changes to solid circles.	Standard mark scheme

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PAPER: 1MA0_2F			
Question		**Modification**	**Notes**
Q22		2cm grid. Right axis labelled	Standard mark scheme
Q24		2cm grid. Right axis labelled. Crosses changes to solid circles.	Standard mark scheme
Q24		2cm grid. Right axis labelled. Crosses changes to solid circles.	Standard mark scheme
Q27		*x* changed to *y*	Standard mark scheme
Q28		Wording added, “AB is parallel to DC”. AD labelled as *x* cm.	Standard mark scheme
Q29	(b)	Mirror B made more obviously an isosceles triangle.	Standard mark scheme

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Mark Scheme (Results)

November 2014

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

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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_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) (b) (c)		18 56 33	1 1 2	B1 cao B1 cao 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

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

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

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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Question 8

This question was generally answered well and most students scored at least one mark. This was available either by converting to percentages, comparable fractions or equivalent decimals, or for a list with one misplaced fraction – usually 7/12. Lists were often given unaccompanied by working, so more than one misplacement resulted in no mark being awarded. There was little evidence of the list given in descending rather than ascending order, though many weaker students simply ordered on the size of the denominator. Attempts by drawing diagrams are to be discouraged, as these are rarely of a consistent size, or accurate enough depictions of the fractions. Accurately stating ½ = 0.5 or 50% and ¼ = 0.25 or 25% was sufficient for the method mark to be awarded, so it was in the student's interest to show their working and stating these simple conversions is a better strategy than poorly drawn diagrams.

Question 14

Part (a) was well answered by most students. There were some errors seen but there was no common pattern.

However, part (b) was not well answered by students. Some students could not see the fault within Fiona's working and thought the answer was correct. The two most frequent incorrect responses were that there are not two halves in one, and that there are only two halves in any number ie. in 48 there are two halves, and both are 24. Thus, finding half of 48 not the number of halves in 48. Those who did answer correctly often worked out that there were 96 halves. The most successful students explained that dividing by half is the same as multiplying by two and therefore there are 96 halves in 48

Question 19

Many students did part (a) well although some common mistakes were to change the denominator to 15 but forgot to multiply the numerator, some added the fractions instead of subtracting and some subtracted the numerators and denominators and got ½.

For part (b), students who attempted this question answered it well and were able to simplify fully. However, the most common mistake seen was for students to find a correct answer and not simplify fully i.e. leaving the answer as 3/6 or simplifying incorrectly 6/12 = 3/6 = 1/3 was seen often.

It is worth noting that some students wrote and tried to use KFC (Keep, Flip, Change). As this was multiplication rather than division no marks were gained by those students and this showed a lack of understanding of the concept of calculating with fractions.

Question 1

The correct answer $\frac{75}{100}$ or $\frac{3}{4}$ was the most common seen with very few incorrect answers.

Question 10

Most students got at least one mark for summing the values in some form. Marks were lost by either using the incorrect value of 120 (eg 120/400) or leaving the answer as 240/400. A few went on to express the answer as a decimal or percentage, or an unsimplified fraction and so lost the final mark, since the answer had to be given as a fraction in its simplest form. Overall a well answered question.

Question 12

This was well done by the majority, giving 9/25 as the final answer. A few students added 6, 9 and 10 incorrectly but were still able to gain the method mark. The final mark was sometimes lost when the student failed to give the final answer as a fraction. Common incorrect answers included 25/9 and 9/100.

Question 14

This was very well answered with the majority gaining both marks. Common errors included not showing working, writing a shortened answer such as 2.4 or 2.5, premature rounding/truncation, or copying the figures incorrectly from the question. Using an incorrect order of operations led to the answer of 1.3530… The most successful students were those who worked out the value of the numerator (and wrote it down) then worked out the value of the denominator (and wrote it down) then did the division. Students need to be careful when using their calculators. Many misinterpreted their calculators and included recurring notation with some of their figures, which was condoned on this occasion. There was no penalty for students who interpreted the question demand by not only showing the figures on the calculator display, but also showed all other figures that could be generated by the calculator, sometimes to 50 or more decimal places.

Question 4

This question was not done very well. Answers given were often not equivalent to $\frac{28}{70}$.
A significant number of students who did some correct working did not give the fraction in its simplest form, most commonly leaving it as $\frac{14}{35}$.

Question 22

This question discriminated well at the top end of the ability range with many students getting each of the possible marks for their response. Some students realized the need to change the mixed numbers to improper fractions and demonstrated they could do this for at least one mixed number but could get no further. They scored 1 mark. Students who successfully multiplied the two mixed numbers but left their answers as improper fractions, for example $\frac{28}{12}$, scored 2 marks. Correct answers in the form of a mixed number scored full marks. They did not need to be fully simplified so, for example, $2\frac{4}{12}$ scored full marks. Many students benefitted from this. Disappointingly, there were a large number of students who tried to reach the answer by multiplying the whole numbers and the proper fractions separately to get an answer of $1\frac{1}{4}$ or equivalent. Some confusion between multiplying and dividing fractions was evident in a significant number of student's responses where inverting the second fraction before multiplying or cross-multiplying was seen quite often.

Question 7

After working out 20 – 7 = 13 to find the number of sweets that Harry had left most students gave the correct fraction 13/20. Some students gave the answer in decimal form and lost the accuracy mark. A few students gave the answer as 7/20, the fraction of the sweets that Nadia had, and were awarded one mark. Those that made an arithmetic error could be awarded the method mark if 20 – 7 was shown but an incorrect answer such as 14/20 with no working meant that no mark could be awarded.

Question 12

Many students gained the first mark for writing 1/10 and 3/5 as decimals or as percentages or for converting them to fractions with a common denominator. Those who used 0.1 and 0.6 tended to be more successful even though some students wrote out a list of decimals from 0.1 to 0.6 and were still unable to identify the halfway number as 0.35. Those who used fractions often struggled to complete the process and those using percentages sometimes failed to gain both marks because they gave 35 as the final answer. Some students gave the final answer as 3.5/10, not understanding that this is not an acceptable format for a fraction.

Question 2

A very well answered question showing students have a good understanding of basic fractions of amounts. Almost all students knew that to find $\frac{1}{3}$ they had to divide by 3, and it was only those making an arithmetic error that typically failed to score the mark. This was a real shame when a calculator was available.

Question 3

This question required students to be able to convert between basic decimals and fractions. Again, it was well answered by students with most scoring the available mark.

Question 4

A significant number of students failed to score here with 0.25 a common incorrect answer, together with 3.4 or 0.34 or 75%.

Question 9

Whilst the correct answer of $\frac{3}{7}$ was the modal answer to part (a), an incorrect answer of ¾ was common. Part (b) was the first poorly answered question on the paper. Many did correctly partially simplify the given ratio to earn one mark or showed an intention to divide both numbers by 12, but few gave the answer in the required form, failing to appreciate that the first number in the ratio had to be 1. Answers such as 1 : 3 or 1 : 2.6 (failing to convert $\frac{6}{12}$ to 0.5) were often seen from weaker students.

Question 10

It was pleasing to see many students scoring well on this question; often only poor arithmetic in calculating 70 × 3 and 50 × 9, or the addition of these products, prevented the award of full marks. However, a significant number of students were unable to correctly work out ¼ of 12, a value of 4 being the most common error. This error could be followed through if a correct method to find ¼ of 12 (for example 12 ÷ 4) had been demonstrated. Unfortunately, this was not often the case.

Question 21

Many students were able to correctly convert the given mixed numbers to improper fractions, gaining one mark, though fewer demonstrated an ability to multiply two fractions together and simplifying before multiplying was seldom seen. Often attempts were made to add the two fractions or cross multiply the two fractions. For those who carried out the fraction multiplication correctly, it was necessary to show further processing or correct cancelling to complete their answer. Some candidates felt the need to convert to equivalent fractions with common denominators and then found the numbers too difficult to deal with.

Question 1

The opening question on the paper was well answered and most could express the number in an appropriate manner.

Question 19

This question appeared challenging for some students to interpret the necessary information. Many just rewrote the question rather than use algebraic notation e.g. L is a half of Adam rather than $L = ½ A$. If they then put $L = 3R$, a process mark was available for good algebra.

However the more successful method was to choose a convenient number for the lowest amount (R) and work out what the others would have, often resulting in 1:3:6, although simplest form was not required and 10, 30 60 assigned was also seen often. Students with these figures were usually able to give the required fraction. Although a few still struggled with adding 1, 3 and 6 and often 9 was seen as the incorrect total.

Question 3

An incorrect answer of 0.9 was common.

Question 22

It was very pleasing to see many good attempts at this question. Many students scored at least one mark for either writing both fractions as improper fractions or for writing two fractions with a common denominator. In each case one error was condoned. Some students found it difficult to subtract $\frac{10}{15}$ from $\frac{3}{15}$ to give a negative value of $-\frac{7}{15}$ and simply wrote $\frac{7}{15}$. Some reached a solution of $\frac{23}{15}$ but then failed to convert it into a mixed number. There were still many who simply subtracted the three separate components, whole number, numerator and denominator leading to a common incorrect answer of 2½. Where improper fractions were used, many students failed to realise that a common denominator was still required for the subtraction of the fractions, getting $\frac{21}{5} - \frac{8}{3}$ then subtracting to get $\frac{13}{2}$.

Question 10

Three quarters of the cohort gave a correct answer to this question. The common incorrect answer was to just write down a decimal answer.

Question 15

This question was not so well answered and proved quite difficult for many students. Those who gained both marks usually did so by converting the given fractions to decimals first then ordering correctly.

However, many students only achieved one mark usually as a result of incorrect or incomplete conversions. It was common to see $\frac{3}{5}$ and $\frac{5}{8}$ correctly converted to a decimal but when converting the other two fractions students often only worked to 1 decimal place hence losing accuracy and gaining two values of 0.6 to compare. This method allowed the award of the method mark only for two correct conversions.

Others showed no working but did list the fractions and some did so correctly, a high risk strategy, others with no working often scored one mark for three fractions ordered correctly.
A small minority tried to work with equivalent fractions but this method often broke down and was rarely successful.

Question 12

In part (a), there did seem to be some improvement in the addition of two fractions at this level, although the predictable incorrect answer of $\frac{6}{18}$ and its simplifications were often seen.

A common denominator of 72 was often preferred to the more straightforward 12. A number of students did change the denominators to 12 but then forgot to adapt the numerators appropriately.

Whilst many were successful in multiplying the two fractions correctly in part (b), many again converted the fractions to equivalent fractions with a common denominator. Unfortunately, this was often followed by just the multiplication (or in some cases addition) of the numerators keeping the same common denominator.

In this part of the question, the answer had to be given in its simplest form. Many students ignored this demand leaving $\frac{15}{80}$ as their final answer or lost the accuracy mark for incorrect cancelling of $\frac{15}{80}$. It was far too common to see division methods applied in this question, often accompanied by KFC written on the page. Overall, it was encouraging to see this question was attempted by almost all students, which is an improvement on previous series.

Question 20

Many students found the demand of this question just too great, and where to start puzzled a great many. Some just worked with the given fractions, adding or subtracting and in some cases multiplying them together. Very few were able to tease out a process to find the required fraction. One mark was awarded for adding the two given fractions, this being just one step away from a correct solution. One mark was also available for identifying the fraction of the unshaded parts of rectangles A and C. However, many simply wrote 3 (instead of $\frac{3}{8}$) and 2 (instead of $\frac{2}{11}$) in the appropriate places. Fraction arithmetic remains an issue with many students writing $\frac{5}{8} + \frac{9}{11} = \frac{14}{19}$. Of those who did make a sensible start, $\frac{49}{88}$ was a common answer which gained 1 mark. Also, $\frac{127}{88}$ was a similar common incorrect answer.

Question 2

Only about two thirds of the cohort was able to correctly answer this question. Some students added 1 and $\frac{3}{10}$ instead of finding the difference.

Question 14

Both parts of this question were well answered with part (b) scoring slightly higher. The symbols used seemed to be well understood by the vast majority of students.

Question 12

This was well done by the majority of students who gained 2 marks. They knew how to write 60 as a fraction of 1000 and then correctly simplified the fraction. Those that did not fully simplify were able to gain one mark for $\frac{60}{100}$. A few students did not use fraction form giving their answers in ratio or decimal form but as long as they wrote $\frac{60}{100}$ as the starting point they were awarded the method mark. Students should be encouraged to always show the first step from the information given in the question.

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 12

Part (a) of this question was well answered with the majority successfully calculating the correct answer. Common errors leading to no marks being awarded were to change $\frac{5}{8}$ to a decimal and divide or to divide by 5 before multiplying by 8. Some arithmetic errors were seen but these were rare.

In part (b) the majority of students gained at least 1 mark for correctly ordering three of the four fractions or correctly converting at least 2 of the fractions to a common format, often decimals. Of the students that converted the fractions to a common format, the majority correctly ordered all four fractions to gain full marks.

Students should be encouraged to show conversions to a common format as those who were awarded no marks often showed no attempt to convert to a common format.

Question 3

Nearly all candidates gave the correct answer.

Question 17

Part (a) showed poor understanding of rounding to significant figures with answers of 8, 80 and 87.6 being common. Many candidates gave answers such as 876 or rounded to the nearest thousand (88 000) or rounded down instead of up (87 500) whilst some candidates included a decimal point in their answer.
In part (b), the majority of candidates answered this question correctly but a written method was rarely seen. There was some evidence of omitting to use brackets in the calculation. Of those who didn't score full marks, many scored the method mark for calculating the numerator or denominator correctly. Indeed, those candidates who worked out the numerator and denominator separately would usually go on to gain full marks. It was surprising that a good number of candidates chose to arbitrarily round their answers to 1 or 2 decimal places and calculate an estimate. Some copied the answer from their calculator incorrectly putting 13.254 thus costing themselves 2 marks.

Question 2

This question was usually answered correctly although answers in an incorrect form were sometimes seen, eg. 30% and 0.3 Occasional miscounting of the number of sections led to an incorrect fraction e.g., 3/9

Question 15

Very few students started by cancelling the 6 and 12. Those who did invariably got full marks. The most common correct approach was to find the product of the numerators and the product of the denominators to give $\frac{30}{84}$ although there were many arithmetic errors along the way. A great number then failed to cancel the fraction to its simplest form, often simply dividing by 2. Another common approach was to find a common denominator giving $\frac{72}{84} \times \frac{35}{84}$ This gained no credit until the student demonstrated how to multiply two fractions together, which they rarely even attempted. A high proportion of incorrect answers showed an attempt to find equivalent fractions first followed by addition of numerators.
Weaker students often crossed multiplied to get $\frac{35}{72}$. This of course also gained no credit.

Question 21

It was pleasing to see many students making valiant efforts to work with the given fractions. The whole numbers 7 and 2 were usually correctly dealt with and the difference between $\frac{3}{8}$ and $\frac{1}{2}\left(\frac{4}{8}\right)$ was usually correct although many left this as a positive one eighth leading to an answer of $5\frac{1}{8}$ Students who converted both mixed numbers to improper fractions often fared better and were able to give a correct final answer. The most common incomplete answer seen was $\frac{39}{8}$.

Weaker students often gave answers of $5\frac{2}{6}$ or, if they had converted to improper fractions, $\frac{54}{6}$ However, in many solutions of students at all levels, simple arithmetic errors were made, 7×8 was often seen not equal to 56

Question 2

Another accessible question with a majority of students correctly writing the decimal as a fraction.

Question 2

Another accessible question with the majority of students correctly writing the decimal as a fraction.

Question 18

This familiar calculator use question was generally answered well and the award of 3 marks was common. Some students only scored one mark in part (a) for either 8.82 or 16.6 and some scored a mark for 1.88 rather than writing all of the digits on their calculator, as instructed in the question. As with previous similar questions, writing an answer containing at least 3 decimal places is sufficient to gain full marks in part (a). A small number gave a fraction so again only scored 1 mark for not fully evaluating their answer.

Whilst the majority of students gave 1.88 in part (b) some rounded to 1.8, 1.87 or 1.90. Follow through from their answer in part (a) was allowed and this was frequently awarded when only partial marks were given in part (a). A small number of students multiplied their answer in part (a) by 10 or 100, but this was not very common.

Question 4

Mostly answered correctly, relatively few candidates chose to simplify to $\frac{2}{7}$ and errors only arose when candidates counted the total number of squares incorrectly.

Question 11

A very well answered question. The most common mistakes were either giving the fraction over 18, found by incorrectly adding the other 2 numbers in the ratio, or choosing the wrong number from the 3 options as the numerator.

Question 3

Writing a fraction as a decimal seemed to be answered by the majority of the cohort but a large number did not write in the correct format, writing their answer as a percentage instead or writing it as a decimal with the wrong magnitude.

Question 5

This question saw mixed results, though a majority still scored the 1 mark available. Of those that did not gain a correct answer, the most common mistake was to have $\frac{1}{2}$ and $\frac{2}{3}$ in the incorrect order. A small number of students ordered the fractions from biggest to smallest, yielding no marks.

Question 9

In part (a) learners were asked to use the information provided regarding the total number of stickers in order to complete the bar chart. This was answered correctly by the majority of learners. Where answers were seen that were not fully correct there was often working shown which allowed for the award of part marks. Common errors included reading one of the two given bar heights incorrectly, this was often the bar height for the football players which was sometimes incorrectly given as 16 or 18.

In part (b) learners were asked to give the fraction of the 40 stickers that are stickers of tennis players and to give the fraction in its simplest form. The majority of learners were able to identify the required fraction and correctly simplify this to give the required answer. The most common reason for an incorrect final answer was to either give the unsimplified fraction or where errors were seen in the attempts to simplify the fraction. A small minority gave the fraction of stickers that were football players rather than the fraction that were tennis players.

Part (c) of the question required learners to convert between ratio and fraction notation. The majority of learners were able to correctly complete the conversion. The most common incorrect answer was $\frac{5}{4}$ where learners did not sum the parts of the ratio to obtain the denominator of the fraction.

In part (d) learners were asked to give the ratio $5:4$ in the form $n:1$. This proved challenging for learners with only a minority able to give the correct answer. Some learners made an attempt to write the given ratio in the required form but made errors when attempting to calculate $5 \div 4$, others started the process to divide but did not reach the form $n:1$. Other incorrect responses included 1:0.8 (the form $1:n$) and answers of 1.25 without $n=$ or any attempt to write as a ratio. There were a significant number of incorrect answers of $5:1$ or where n had been introduced into the ratio in some way, for example $5n:4$.

Question 20

This question differentiated well between learners. In part (a) learners were to perform a subtraction of mixed numbers. Slightly under half of the learners were able to correctly write both fractions over a common denominator, subtract them and give the answer as a mixed number. There were a significant minority of learners who had a partially correct response where they had attempted to write the fractions with a common denominator in order to subtract, but either gave the answer as an improper fraction or made an error in one of the numerators when writing the fractions with a common denominator. There were also a significant proportion of incorrect responses seen which sometimes made an attempt to write over common denominators but had no correct numerator due to errors in the method or where an incorrect method was attempted, often combining the whole number part of the fraction, numerator and denominator in some way. A few learners added rather than subtracted their fractions.

In part (b), learners were asked to show a given result for the division of two mixed numbers. There were a minority of fully correct answers showing the required result. A similar number of responses gained 2 marks having converted one, or both, of the mixed numbers to

improper fractions and then showing a method to divide by a fraction, but making an arithmetic error or not showing sufficient working to justify the required result. Many learners failed to achieve the third mark because they were unable to show how $\frac{63}{28} = 2\frac{1}{4}$. The 'keep, flip, change' approach to multiplying fractions was the more popular of the two. There were also a significant proportion of learners who gained 1 mark for conversion of one or both of the mixed numbers to improper fractions. Incorrect answers were common, with many incorrect attempts at converting mixed numbers to improper fractions and incorrect approaches to multiplication of fractions attempted.

Question 2

Knowledge of basic fraction and decimal equivalents was a topic that learners were confident on with many correctly recalling that $\frac{3}{4}$ is equivalent to 0.75. Where incorrect answers were seen these included 0.25, 0.3, 0.34, 3.4, 34, 7.5 and 75.

Question 4

The most common correct form for the answer was $\frac{4}{10}$ but an alternative equivalent form was also accepted such as $\frac{2}{5}$, 0.4 or 40%. As long as the answer line was blank, it was also acceptable to positively indicate $\frac{4}{10}$ in the list e.g. by circling, underlining or using an arrow to point at it. The most common incorrect answers were $\frac{3}{9}$, $\frac{5}{15}$ and $\frac{6}{18}$.

Question 20

In part (a), 2 marks were awarded for an answer of 0.2650780261. Only the first three decimal places needed to be correct to gain full marks. Where 2 marks were not awarded, M1 could be given for a value listed in the mark scheme, most commonly the fraction 1257/4742 displayed directly from the calculator. Responses that gave an incorrect answer without any working were awarded 0 marks.
In part (b), B1 was awarded for an answer of 0.27. If the answer to part (a) was incorrect, a follow-through mark could be awarded if that value was rounded correctly to 2 significant figures, provided the original value had at least 3 significant figures. Common incorrect answers included 0.37 and 0.3.

Pearson Edexcel

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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