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GCSE MATHS

Number

Edexcel 1MA1 | Subtopic collection Topic 02

Primes, factors, HCF and LCM

Foundation tier

Answers and examiner comments

91	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.

Question	Working	Answer	Mark	Notes
6 (i)		4 or 5	1	B1 for 4 or 5
(ii)		30 or 40	1	B1 for 30 or 40
(iii)		29	1	B1 cao

8	(a)		3 or 15	1	B1
	(b)		12 or 24	1	B1
	(c)		2 or 3	1	B1

8	(a)		1, 2, 3, 6, 9, 18	2	B2 for all 6 factors and no extra ones, ignore repeats [B1 for 4 correct factors in a list containing no more than 6 numbers or all 6 correct factors with one extra incorrect factor]
	(b)		21, 28	1	B1 cao

5MB2F_01

Question		Working	Answer	Mark	Notes
16			eg. 10, 12, 5, 2	3	M1 for at least 2 factors of 60 clearly identified M1 for 20 < sum of '4 distinct natural numbers' < 35 A1 cao

10	(a)		3	1	B1 cao
	(b)		Square on grid	1	B1 correct position
	(c)		Square drawn	2	B2 for square within tolerance (see overlay) (B1 for any line 4 cm ± 2mm or angle 90° ± 2°)

Question		Working	Answer	Mark	Notes
3	(a)		16 or 4	1	B1 for 4 or 16 (or both)
	(b)		21	1	B1 cao
	(c)		10 or 15	1	B1 10 or 15 (or both)

6	(a)		3 sectors shaded	1	B1 for 3 sectors shaded oe
	(b)		60	1	B1 cao
	(c)		4	1	B1 cao
	(d)	40 ÷ 8 × 3	15	2	M1 for 40 ÷ 8 × 3 oe A1 cao
	(e)		13 or 17	1	B1 13 or 17

12	(a)		reflection	2	B2 for correct reflection in correct position (B1 for at least 2 vertices in the correct position)
	(b)		enlargement	2	B2 for correct enlargement scale factor 3 (B1 for at least 2 lines correctly enlarged or any enlargement using an incorrect scale factor, sf $\neq 1$)
	(c)		105	2	M1 for $360 - (90 + 128 + 37)$ oe or $x + 90 + 128 + 37 = 360$ A1 cao

1MA0_1F

15			3 primes that total 20	3	M1 for identifying at least 2 different prime numbers from the list, could indicate on the list (not more than one incorrect) M1 for any 3 numbers from the list that total 20 A1 for 2, 7, 11 or 2, 5, 13 or both (in any order)

1MA0_1F

Question		Working	Answer	Mark	Notes
6	(a)		reflection	1	B1 for correct reflection
	(b)		2	1	B1 for 2
	(c)		parallel lines	1	B1 for two parallel lines drawn
	(d)		A and F or B and D	1	B1 for A and F or B and D
*7			no and reason	3	M1 adding 6.25 km, 4 km 750 m and 8½ km M1 addition with consistent and correct use of units C1 for no and a correct comparison eg no and 19.5 (km) oe eg no and 0.5 (km) oe

17	(i)		30	1	B1 cao
	(ii)		40	1	B1 cao

Original question 10

The full source mark scheme begins on page 117. Use the original paper code, tier and question number shown above.

Question		Working	Answer	Mark	Notes
11	(a)		12	1	B1 cao
	(b)		14	1	B1 cao
	(c)		16	1	B1 cao

16			×2 enlargement	2	M1 for quadrilateral with at least 2 correct sides A1 cao

13		eg. 18, 4, 5	3	M1 for two different factors of 40 M1 for 3 numbers where the sum lies between 20 and 30 **AND** (where one is 9 or 18 **or** two are different factors of 40 A1

3	(a)		3 or 5 or 21	1	B1 for 3 or 5 or 21
	(b)		16	1	B1 cao
	(c)		24	1	B1 cao

7	(a)		C and D	1	B1 cao
	(b)(i)		F	2	B1 cao
	(b)(ii)		2		B1 cao

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”

Paper: 5MB2F_01

Question		Working	Answer	Mark	Notes
7	(a)		Twenty thousand and four hundred	1	B1 cao
	(b)		–21	1	B1 cao
	(c)		27	1	B1 cao
	(d)		16	1	B1 cao
	(e)		5	1	B1 cao
	(f)		1:3	1	B1 cao

Paper: 5MB2F_01

8	(a)		reflection	2	B2 cao (B1 for reflection with correct orientation)
	(b)		2	1	B1 for 2

PAPER: 5MB3F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
4	(a)		Reflection	1	B1 for correct reflection
	(b)		2	1	B1 cao

Original question 25

The full source mark scheme begins on page 137. Use the original paper code, tier and question number shown above.

18	(a)	2,5	2 or 5	1	B1 cao
	(b)	1, 4, 9, 16 1 + 4 + 16	1, 4, 16	2	M1 for identifying at least 2 different square numbers from the list A1 cao
19	(a)		–0.5	2	M1 for intention to subtract 19 from both sides or divide all terms by 8 as a first step A1 for –0.5 oe
	(b)		3	2	M1 for a correct operation to collect the c terms or the number terms on one side of the equation e.g. $2c - c + 5 = 8$, $2c + 5 - 5 = c + 8 - 5$ A1 cao

PAPER: 1MA0_2F

Question		Working	Answer	Mark	Notes
13	(a)		Odd	1	B1 cao
	(b)		$5n$	1	B1 cao
	(c)		$\frac{t}{4}$	1	B1 oe

20	(a)(i)		Shapes completed	2	B1 for correct shape
	(ii)				B1 for correct shape
	(b)		Shape enlarged	2	B2 correct enlargement drawn (B1 for correct enlargement in one direction or a correct enlargement with scale factor other than 2)

PAPER: 1MA0/1F

Question		Working	Answer	Mark	Notes
10	(a)		6	1	B1 cao
	(b)		44	1	B1 cao
	(c)		33, 11, 4 or 4, 11, 33 or 8, 4, 6 or 6, 4, 8	1	B1 cao

18		drawing	2	M1 for (quadrilateral with) at least 2 correct sides A1 cao

PAPER: 1MA0_2F

18	(a)		Diagram	2	B2 for a correct enlargement scale factor 3 (B1 for at least 2 lines correctly enlarged or any enlargement using an incorrect scale factor, sf $\neq$ 1)
	(b)		Diagram	2	B2 for correct tessellation (at least 5 more shapes) (B1 for at least 4 shapes, including initial shape, correctly tessellating ignoring extra shapes)

PAPER: 1MA0/1F

13	(i)		72	3	B1 cao
	(ii)		5		B1 cao
	(iii)		5 or 31		B1 cao

PAPER: 1MA0/2F

Question	Working	Answer	Mark	Notes	Type
14	6, 10, 14, 18 8, 13, 18	18	3	M1 for listing at least 3 multiples of 4 and at least 3 multiples of 5 M1 for adding 2 to multiples of 4 **and** adding 3 to multiples of 5 A1 for 18 cao	E
*15	120 ÷ 8 × 5 80 + 75 = 155 155 > 150 OR 150 – 80 = 70 70 ÷ 5 × 8 112 < 120	No with reason	3	M1 for method to convert 120 km to miles 120 ÷ 8 × 5 (=75) M1 for 80 + '75' (=155) C1 for No with correct total distances in miles OR M1 for 150 – 80 = 70 M1 for complete method to convert 70 miles to km 70 ÷ 5 × 8 (=112) C1 for No with correct values for distance driven in France and mileage remaining.	E

15	(a)		trapezium	1	B1 cao
	(b)		8	2	M1 for a strategy to find the area, eg splitting the shape into two triangles or drawing a rectangle around it or using the formula for the area of a trapezium A1 cao
	(c)		Shape reflected	2	B2 for correct reflection drawn (B1 for 3 vertices correct or correct orientation, incorrect position)
	(d)		Enlargement sf 3 drawn	2	B2 correct enlargement drawn (B1 for any two sides correct or a correct enlargement with scale factor other than 3)

Paper: 1MA0/2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
*16		Yes with comparable values	3	M1 for method to change 14 ft 4 in to in eg 14 × 12 + 4 (= 172) M1 for method to convert an amount of in to cm eg "172" × 2.54 (= 436.(88) or 437), 4 × 2.54 (=10.16), (12 × 14) × 2.54 (=426.72) C1 for Yes with 4.36-4.37 or with 436.(88) or 437 and 440 OR M1 for method to convert 4.4 m to cm eg 4.4 × 100 (= 440) M1 for method to convert cm to in eg 440 ÷ 2.54 (= 173.22...) C1 for Yes with 14 ft 5 in OR M1 for method to convert 4.4 m to cm eg 4.4 × 100 (= 440) M1 for method to change 14 ft 4 in to in eg 14 × 12 + 4 (= 172) C1 for Yes with 173(.22..) and 172

22		2×2×2×7	M1 A1	for complete method to find prime factors; could be shown on a complete factor tree with no more than 1 arithmetic error accept $2^3 \times 7$

Paper: 1MA1/1F

8	(a)		25	B1	for 25 (accept 5^2)
	(b)		24	B1	cao
	(c)		23, 29	B1	for 23 and 29 and no extras

23		2×2×3×3	M1 A1	for complete method to find prime factors; could be shown on a complete factor tree with no more than 1 arithmetic error or 2,2,3,3,(1) for 2×2×3×3 oe

2		42 or 48	B1	42 or 48

Question	Working	Answer	Mark	Notes
7		No	B1	for showing 11 or 13 or 17 or 19 with no non-prime numbers between 10 and 20, or for showing 23 or 29 with no non-prime numbers between 20 and 30. Ignore any numbers shown below 11.
		(supported)	C1	"No" supported by listing 11, 13, 17, 19 and 23, 29 and no non-prime

14 (a)		Example	M1	Chooses two odd numbers and substitutes into $2(a + b)$ oe
			C1	Calculates $2(a + b)$ correctly to arrive at a number that is a multiple of 4
(b)		Reasoning	C1	States $a + b$ is even or $2a$ is even or $2b$ is even
			C1	Completes argument.

Paper: 1MA1/2F

3		1, 2, 3, 6, 9, 18	B2 [B1	for all 6 factors with no incorrect for at least 3 factors with no more than one error]

9		2, 7 or 3, 13 or 5, 11 or 2, 23	M1 A1	for identifying two different prime numbers or two numbers which add up to give a square number or for a list of at least 3 prime numbers with no errors **and** a list of 3 square numbers with no errors. for two correct prime numbers

5	14	B1	cao	

11	(a)	Example	C1	for a correct example, eg 3 × 4 = 12 or 12 ÷ 3 = 4 **or** a statement eg '3 is a factor of 12' or '1 is a factor of every number'	This may be seen, for example, in a factor tree or in a list of factors, but there must be no incorrect factors on the tree or in the list
	(b)	Example	C1	for an example, eg 23 **or** a statement eg. 'the tens digit may be even' or 'the last digit only needs to be odd'	

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
18 (a)	15, 17, 19, 20, 21, 23, 25	M1	for listing either set eg 15,20,25 **or** 15,17,19,21,23,25 with no incorrect numbers	The 'lists' may be seen in a Venn Diagram or in the working space in part (b) provided they are not contradicted by incorrect lists in part (a)
		A1	15,17,19,20,21,23 and 25 with no repeats	If repeats (but no incorrect numbers) award M1 only.
(b)	Statement or 15 and 25	C1	eg odd multiples of 5 (between 14 and 26) oe NB Could be a general description, eg numbers that are in both (A and B), **or** 15 and 25 (ft from their sets A and B in part (a)) **or** numbers ending in 5 (between 14 and 26)	

6		3 and 9	P1 A2 (A1	for starting to list factors of 36 **or** multiples of 3 **or** odd numbers cao for one correct answer)	Must be at least 3. In either order

Question		Answer	Mark	Mark scheme	Additional guidance
10	(a)	23, 29	B2	for 23 **and** 29 **and** no extras	
			(B1	for one correct **and** no more than one incorrect)	2 correct and 1 incorrect award B1
	(b)	Explanation	C1	for decision **and** explanation eg yes and because all other even numbers have 2 as a factor	Decision is required may be yes or implied by she is ... oe. Do not accept statements that are ambiguous, or contradictory

21	(a)	280	M1	for listing at least 3 multiples of both 40 and 56 **OR** finds the prime factors of both 40 and 56	40, 80, 120, … 56, 112, 168, … **OR** 2,2,2,5 and 2,2,2,7
			A1	cao	
	(b)	60	B1	60 **or** $2^2 \times 3 \times 5$ oe	2^2, 3, 5 not enough ie must be a product

6	1, 2, 3, 5, 6, 10, 15, 30	B2 (B1	cao for at least 3 correct factors with no more than one incorrect answer)	Numbers may be shown in any order eg paired; Accept numbers repeated

3	5	B1	cao	

10	3 and 29 or 13 and 19	M1 A1	for two numbers with a sum of 32, only one of which is prime, eg 5, 27 or 1, 31 cao	Do not accept 1 as a prime number.

Question	Answer	Mark	Mark scheme	Additional guidance
15	6	P1	for listing the multiples of 3 **and** 5 to at least the number 15 **or** 3 × 5 (= 15)	3, 6, 9, 12, 15 and 5, 10, 15
		P1	for considering multiples of 15, eg 4 multiples of 15 identified **or** 100 ÷ 15 (=6.6..) **or** an answer of 7	If in a list of multiples of 3 and 5, multiples of 15 must be clearly identified Sight of 6.6(…) or $6\frac{2}{3}$ oe or an answer of 7 gets 2 marks.
		A1	cao	

4	23 or 29	B1	for 23 or 29	Do not award if any other numbers are included, but award if both 23 and 29 are shown.

24	18	M1 A1 	for listing factors of 72 and 90, at least 4 correct for each (with no more than 1 incorrect in each list), could be in factor pairs **OR** for the prime factors of 72 (2, 2, 2, 3, 3) **or** 90 (2, 3, 3, 5) for 18 or 2×3^2 oe SC B1 for answer of 6 or 9 if M0 scored	Factors of 72: 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, 72 Factors of 90: 1, 2, 3, 5, 6, 9, 10, 15, 18, 30, 45, 90 2, 3^2 is not enough, it must be a product

3	At least **two** of 1, 3, 5, 15	B1	for at least two of 1, 3, 5, 15 with no incorrect values	Accept 3 × 5 etc.

2	48 or 56	B1	for 48 or 56	Accept either or both. Do not award the mark if other numbers are shown with either.

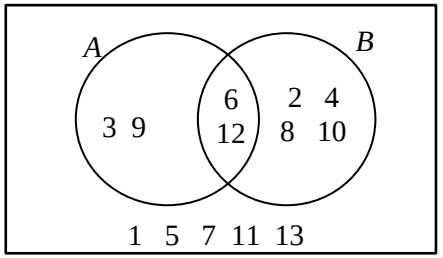
Question	Answer	Mark	Mark scheme	Additional guidance
20	1080	M1	for method to write one number as a product of prime factors (condone one division error in method chosen), eg. one complete factor tree or 2, 2, 3, 3, 3 or 2, 2 , 2, 3, 5 or for listing at least 5 multiples of either number (condone one error) or for any common multiple (≠ 1080), eg. 12960 (= 108 × 120)	Accept first 5 multiples if all correct or one error in first 6 multiples
		M1	for method to write both numbers as a product of prime factors (condone a total of one division error) eg. two complete factor trees or 2, 2, 3, 3, 3 **and** 2, 2, 2, 3, 5 or lists of multiples of the two numbers, at least 5 of each, one of which includes 1080	For the list not containing 1080, accept first 5 multiples if all correct or one error in first 6 multiples
		A1	cao SC B2 for any product that would lead to 1080, eg $2^3 \times 3^3 \times 5$ or $12 \times 9 \times 10$	

Paper: 1MA1/1F

Paper: 1MA1/3F

Question	Answer	Mark	Mark scheme	Additional guidance
1	Two correct factors	B1	for 2 correct factors from 1, 2, 3, 4, 6, 12 and no incorrect factors	Accept one correct product

4	18	B1	cao	

20	Venn Diagram	B1 M1 M1 A1	for labelling diagram, accept “multiples of 3” and “even numbers” for labels for correct numbers in at least one region for correct numbers in at least two regions for all regions correct	Ignore all entries except the region you are marking for each method mark 

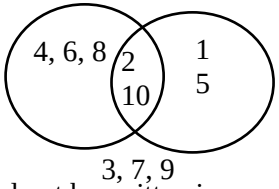
2	18	B1	cao	18 must be the only number selected for this award

12	L23, U23, L29, U29	B2 (B1	for all 4 outcomes with no extras or repeats for at least 2 correct outcomes out of at most 8 different outcomes **or** for indicating 23 and 29 are the only prime numbers between 20 and 30)	Pairs must be unambiguous and in the correct order of letter number

21	(a)	2×2×3×7	M1	for a complete method to find prime factors, could be shown on a factor tree, with no more than one arithmetic error **or** for 2, 2, 3, 7	Condone the use of 1
			A1	for 2 × 2 × 3 × 7 oe	Accept $2^2 \times 3 \times 7$
	(b)	420	M1	for at least 3 multiples of both 60 and 84 (can include 60 and 84) **or** finds the prime factors of both 84 (may be seen in (a)) and 60, may be seen in factor trees	60, 120, 180, 240, 300, 360, 420 84, 168, 252, 336, 420 60 = 2 × 2 × 3 × 5 or $2^2 \times 3 \times 5$ If factor tree in (a) is incorrect ft this factor tree in part (b) for M1 only
			A1	420 or 2 × 2 × 3 × 5 × 7 oe	

Paper: 1MA1/2F

Paper: 1MA1/2F

Question	Answer	Mark	Mark scheme	Additional guidance
22 (a)	Venn diagram	M1	for correct numbers in at least one region	Ignore all entries except the region you are marking for each method mark
		M1	for correct numbers in at least two regions	
		A1	for all regions correct	
(b)	$\frac{2}{10}$	M1	for $\frac{a}{10}$ where $0 < a < 10$ and a is an integer **or** $\frac{2}{b}$ where $b > 2$ and b is an integer **or** ft diagram	Need not be written in correct form at this stage eg could be a ratio 2 : 10 Repeated digits in the diagram should be counted as 2 elements
		A1	$\frac{2}{10}$ oe or ft diagram	Accept any equivalent fraction, decimal form 0.2 or percentage form 20%

6	(a)	25	B1	cao	
	(b)	24	B1	cao	

22	(a)	12	M1	for a correct factor tree for either 60 **or** 84 with no more than one arithmetic error **or** for listing factors of 60 **or** 84, at least 4 correct for either (with no more than 1 incorrect in either list), could be in factor pairs **or** for the prime factors of 60 (2, 2, 3, 5) **or** 84 (2, 2, 3, 7)	Condone the use of 1 in any factor tree 60: 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60 84: 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84
			A1	for 12 or 2×2×3 oe SC B1 for answer of 4 or 6, if M0 scored	2,2,3 is not enough, it must be a product
	(b)	120	M1	for a correct factor tree for either 24 **or** 40 with no more than one arithmetic error **or** for at least 3 multiples of both 24 and 40 (can include 24 and 40) **or** for the prime factors of either 24 (2, 2, 2, 3) **or** 40 (2, 2, 2, 5) **or** for a common multiple from their lists (≠ 120)	Condone the use of 1 in any factor tree 24: 24, 48, 72, 96, 120, … 40: 40, 80, 120, … For the list not containing 120, accept the first 3 correct multiples or one error in the first 4 multiples
			A1	for 120 or 2×2×2×3×5 oe	

Paper: 1MA1/2F

2	2 factors	B1	at least 2 of 1,5,7,35	No incorrect factors

24	$2 \times 2 \times 31$	M1	for a complete method to find prime factors; could be shown on a complete factor tree with no more than one error **or** by division by prime factors with no more than one error **or** for 2, 2, 31, (1)	Condone the inclusion of 1 for this mark
		A1	for $2 \times 2 \times 31$ oe	Accept $2^2 \times 31$

Paper: 1MA1/1F

4	Suitable number eg 725	B1	for a suitable 3 digit number ending in 0 or 5	

3	Two from 1, 2, 3, 4, 6, 12	B1	for any two correct factors from 1, 2, 3, 4, 6, 12	Do not allow any incorrect numbers

Question	Answer	Mark	Mark scheme	Additional guidance
21	168	M1	for a list of at least 3 multiples of each number or for factors 3,2,2,2 oe and 7,2,2,2 oe (could be shown in a factor tree or Venn diagram or table)	Condone the use of 1 as a factor
		A1	cao	

4	10 or 12	B1	for 10 or 12	Accept both 10 and 12 given

11	(a)(i)	2	B1	for 2	Accept 2× or ×2 oe
	(ii)	cross placed	B1	for cross correctly placed or indicated by intersection of construction lines	
	(b)(i)	line drawn	B1	for line $y = x$ drawn	Accept line of any length, dotted or dashed and/or drawn freehand
	(ii)	$y = x$	B1	for $y = x$ oe, eg. $x = y$ or $y - x = 0$ or $x - y = 0$ **or** ft their line drawn in (b)(i)	Accept labelled on the diagram

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
19	$2^2 \times 5^3$	M1	for a complete method to find prime factors; could be shown on a complete factor tree with no more than one error or by division by prime factors with no more than one error	Condone the inclusion of 1 for the method marks
		M1	for complete factorisation, eg 2, 2, 5, 5, 5	Could be shown on a fully correct factor tree
		A1	for $2^2 \times 5^3$	

5	18	B1	cao	

7	Three correct factors	B2 (B1	for at least **three** from 1, 2, 4, 5, 10, 20 for **two** correct factors from 1, 2, 4, 5, 10, 20 and no more than one incorrect factor)	No incorrect factors No repeats (within the chosen 3) Ignore extra correct factors. Accept factor pairs, eg. 1 × 20 as two factors

Paper: 1MA1/1F

5	100	B1	cao	

21	$2 \times 2 \times 3 \times 5$	M1 A1	for a complete method to find prime factors, could be shown on a complete factor tree, with no more than one error or by division by prime factors with no more than one error **or** for 2, 2, 3, 5 (1) for $2 \times 2 \times 3 \times 5$ oe	Condone the inclusion of 1 for the method mark Accept $2^2 \times 3 \times 5$

Paper: 1MA1/3F

Question	Answer	Mark	Mark scheme	Additional guidance
24 (a)	63	B1	for 63, accept $3 \times 3 \times 7$ or $3^2 \times 7$	
(b)	15 876	M1	for at least two of 2^2, 3^4, 7^2 **or** shows at least 3 multiples of 2268, eg 2268, 4536, 6804 and at least 3 multiples of 441, eg 441, 882, 1323	(A =) $2^2 \times 3^4 \times 7$ scores 0 marks
		A1	for 15 876 or $2^2 \times 3^4 \times 7^2$ oe	

11	Diagram	M1 A1	for a correct base length (6 cm) drawn or correct height (9 cm) drawn **or** a fully correct enlargement of a scale factor not equal to 3 fully correct enlargement	

Paper: 1MA1/1F

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
20 (a)	$2^2 \times 3 \times 13$	M1	for a complete method to find prime factors; could be shown in a complete factor tree with no more than one error **or** by division by prime factors with no more than one error **or** for 2, 2, 3, 13 (1)	Condone the inclusion of 1 for this mark
		A1	$2^2 \times 3 \times 13$ **or** $2 \times 2 \times 3 \times 13$ oe	
(b)	26	M1	for a correct factor tree for 130 (or 156 if not credited in part (a)) with no more than one arithmetic error **or** for listing factors of 156 or 130, at least 4 correct for either (with no more than 1 incorrect in either list), could be in factor pairs **or** for the prime factors of 130 (2, 5, 13) (or 156 if not credited in part (a)). **or** identifies a common factor other than 1 (2 or 13)	Condone the inclusion of 1 for this mark 1, 2, 3, 4, 6, 12, 13, 26, 39, 52, 78, 156 1, 2, 5, 10, 13, 26, 65, 130
		A1	cao	

Paper: 1MA1/1F

Question	Answer	Mark	Mark scheme	Additional guidance
1	Two of: 1, 2, 3, 6, 9, 18	B1	for 2 correct factors and no incorrect	Allow more than 2 correct factors but no incorrect.

4	35	B1	cao	

Original question 21

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

Question	Answer	Mark	Mark scheme	Additional guidance
8	No from correct figures	P1	for process to find year of Aisha's 18th birthday, eg 1993 + 18 (= 2011) **or** for process to find Aisha's age in 2030, eg 2030 – 1993 (= 37)	
		P1	for process to find years of future elections, eg writes down 2011, 2016, 2021, 2026, 2031 **or** for 2011 + 4 × 5 (= 2031) oe **or** for process to find Aisha's age in years when there is an election, eg writes down 18 in 2011, 23 in 2016, 28 in 2021, 33 in 2026 and 38 in 2031 **or** for process to find years between 18th birthday and election eg 2030 – 2011 (= 19)	At least 3 correct values needed At least 3 correct values needed, condone years missing eg 18, 23, 28,… without 2011, 2016, 2021…
		A1	for No with correct figures eg 2011 **and** 2026 or 2031 **or** for No with eg 37 **and** 33 or 38 **or** for No with 2011 (2016, 2021, ...) **and** explanation that election years end in 1 or 6, not 0 **or** for No with 2011 **and** explanation that 19 is not divisible by 5	

Paper: 1MA1/3F

12	3 of 23, 29, 31, 37	M1	for two correct and not more than one incorrect, eg 23, 27, 29	May be shown in working space. Ignore numbers less than 20 or greater than 40
		A1	for three correct and no incorrect	Accept 4 correct and no incorrect

Paper: 1MA1/3F

22	21	M1 A1	for a complete factor tree for 63 or 105 with no more than one arithmetic error **or** for listing at least 4 correct factors (with no more than 1 incorrect) of 63 or 105, could be in factor pairs **or** for the prime factors of 63 (3, 3, 7) or 105 (3, 5, 7) cao SCB1 for answer of 3 or 7 or 3 × 7 if M0 scored	Condone the inclusion of 1 for this mark May be seen in different ways, 1, 3, 7, 9, 21, 63 1, 3, 5, 7, 15, 21, 35, 105 Prime factors may be seen in a diagram eg a Venn diagram

Paper: 1MA1/3F

4	27	B1	cao	

3	Any two correct 1, 2, 4, 8, 16	B1	two correct and no incorrect	Allow more than two factors but all must be correct

Question	Answer	Mark	Mark scheme	Additional guidance
16 (a)	$2 \times 3^2 \times 7$	M1	for a complete factor tree with no more than one arithmetic error **or** 2, 3, 3, 7	Condone the inclusion of 1 for this mark
		A1	accept $2 \times 3 \times 3 \times 7$	
(b)	42	M1	for a complete factor tree for 210 (or 126 if not credited in part (a)) with no more than one arithmetic error **or** for listing factors of 126 or 210, at least 4 correct for either (with no more than 1 incorrect in either list), could be in factor pairs **or** for the prime factors of 210 (2, 3, 5, 7) (or 126 if not credited in part (a))	Condone the inclusion of 1 for this mark 1, 2, 3, 6, 7, 9, 14, 18, 21, 42, 63, 126 1, 2, 3, 5, 6, 7, 10, 14, 15, 21, 30, 35, 42, 70, 105, 210 Prime factors may be seen in a diagram eg a Venn diagram
		A1	accept $2 \times 3 \times 7$ SCB1 for answer of 2 or 3 or 6 or 7 or 14 or 21 if M0 scored	

4	32	B1	cao	

19	6	M1 A1	for a complete factor tree for 54 or 120 with no more than one arithmetic error **or** for listing at least 4 correct factors (with no more than 1 incorrect) of 54 or 120, could be in factor pairs **or** for the prime factors of 54 (2, 3, 3, 3) or 120 (2, 2, 2, 3, 5) cao SCB1 for an answer of 2 or 3 or 2 × 3 if M0 scored	Condone the inclusion of 1 for this mark Factors of 54: 1, 2, 3, 6, 9, 18, 27, 54 Factors of 120: 1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 20, 24, 30, 40, 60, 120 Prime factors may be seen in a diagram eg a Venn diagram

Paper: 1MA1/1F

20 (a)	2×5^3	M1 A1	for a complete method to find prime factors; could be shown on a complete factor tree with no more than one arithmetic error or by division by prime factors with no more than one error **or** for 2, 5, 5, 5 accept $2 \times 5 \times 5 \times 5$ oe	Condone the inclusion of 1s for this mark

Paper: 1MA1/2F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
20 (b)	150	M1	for at least 3 multiples of both 30 and 25 (can include 30 and 25) **or** for the prime factors 2, 3, 5 and 5, 5 (could be shown in a factor tree with no more than 1 arithmetic error or Venn diagram or table) **or** identifies the factors 5, 5 and 6 (may be seen in a grid) **or** for a different common multiple, eg 300	30, 60, 90, 120, 150, 180, 210, 240 25, 50, 75, 100, 125, 150, 175 $30 = 2 \times 3 \times 5$ $25 = 5 \times 5$ Condone the inclusion of 1s for this mark
		A1	150 or $2 \times 3 \times 5 \times 5$ oe	

5	Two correct factors	B1	for 2 correct factors from 1, 2, 4, 8, 16, 32 and no incorrect factors	Accept one correct product

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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)

PMT

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

PMT

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

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

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})

PMT

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

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

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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)

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NOTES ON MARKING PRINCIPLES

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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.

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

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

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

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

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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.

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

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

PAPER: 1MA0_1F			
Question		**Modification**	**Notes**
1		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	

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

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Mark Scheme (Results)

Summer 2024

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

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General marking guidance

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

1 All candidates must receive the same treatment. Examiners must mark the last candidate in exactly the same way as they mark the first. Where some judgement is required, mark schemes will provide the principles by which marks will be awarded; exemplification/indicative content will not be exhaustive. When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the response should be sent to review.

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

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

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

4 Choice of method
If there is a choice of methods shown, mark the method that leads to the answer given on the answer line.
If no answer appears on the answer line, mark both methods then award the lower number of marks.

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

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

7 Ignoring subsequent work
It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question or its context. (eg an incorrectly cancelled fraction when the unsimplified fraction would gain full marks).
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect (eg. incorrect algebraic simplification).

8 Probability
Probability answers must be given as a fraction, percentage or decimal. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

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

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

11 Number in brackets after a calculation
Where there is a number in brackets after a calculation eg 2 × 6 (=12) then the mark can be awarded either for the correct method, implied by the calculation or for the correct answer to the calculation.

12 Use of inverted commas
Some numbers in the mark scheme will appear inside inverted commas eg "12" × 50 ; the number in inverted commas cannot be any number – it must come from a correct method or process but the candidate may make an arithmetic error in their working.

13 Word in square brackets
Where a word is used in square brackets eg [area] × 1.5 : the value used for [area] does not have to come from a correct method or process but is the value that the candidate believes is the area. If there are any constraints on the value that can be used, details will be given in the mark scheme.

14 Misread
If a candidate misreads a number from the question. eg uses 252 instead of 255; method or process marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review.

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

PMT

Paper: 1MA1/2F					
Question		**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
1		–3 –1 2 4 7	B1	for –3 –1 2 4 7	Allow correct reverse order: 7 4 2 –1 –3
2		5	B1	cao	
3		0.31	B1	cao	Accept .31
4		35	B1	cao	
5		2	B1	cao	
6	(a)	10	B1	cao	
	(b)	2 full squares and 3 quarters of a square	B1	for a diagram for April showing the equivalent of 2 full squares and 3 quarters of a square	eg 11 quarter squares drawn separately 3 quarters may be seen as one half square and one quarter square
	(c)	18	P1	for process to find houses sold in February = 4 + 4 + 1 (= 9) or March = 4 + 4 + 4 (= 12) **or** 60 – ([Jan + Feb + Mar] + 11)	February and March totals may be seen on the diagram May be implied by 42 [Jan + Feb + Mar] is clearly their houses sold in Jan, Feb and March for this mark only
			P1	for a complete process, eg. 60 – ([answer to part (a)] + "9" + "12" + 11) or $60 - (2\frac{1}{2} + 2\frac{1}{4} + 3) \times 4 - 11$	$4\frac{1}{2}$ squares drawn for May gets P2
			A1	cao	18 must be seen for full marks
7	(a)	8.7	B1	for answer in the range 8.5 to 8.9	
	(b)	67	B1	for answer in the range 65 to 69	
	(c)	6-sided shape	B1	for a 6-sided shape	Allow free hand drawing

Paper: 1MA1/2F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
8 (a)	2, 1	B1	cao	
(b)	0, – 2	M1	for an answer of $(0, y)$ where $y \neq -2$ or $(x, -2)$ where $x \neq 0$ **or** the correct midpoint identified on the grid **or** $(2 + -2) \div 2$ or $(1 + -5) \div 2$	
		A1	cao SCB1 if M0 scored for – 2, 0	
(c)	C shown at $(-4, 2)$	C1	cao	
9	379.86	P1	for process to work with number of miles or cost, eg 47879 – 47241 (= 638) **or** 47879 × 47 (= 2250313) or 47241 × 47 (= 2220327) **or** [mileage] × 47	working may be seen in £ or pence throughout [mileage] is any value they consider to be mileage
		P1	for process to work with miles and cost, eg "638" × 47 (= 29986) or "638" × 0.47 (= 299.86) **or** "2250313" – "2220327" (= 29986)	
		B1	(indep) for converting between pence and pounds, eg "29986" ÷ 100 **or** 47 ÷ 100 (= 0.47) **or** 80 × 100 **OR** miles divided by 100, eg "638" ÷ 100 (= 6.38) **or** 47879 ÷ 100 (= 478.79) **and** 47241 ÷ 100 (= 472.41)	
		A1	for 379.86	
10	HHH, HHT, HTH, HTT, THH, THT, TTH, TTT	M1	for at least 3 correct outcomes from HHH, HHT, HTH, HTT, THH, THT, TTH, TTT ignoring extras and repeats	May be written in words
		A1	for all 8 outcomes with no extras or repeats	

Paper: 1MA1/2F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
11	No with reason	C1	No with reason **Acceptable reasons:** (The sections are) not the same size **or** the angles are not the same (The arrow is) more likely to land on 1 or 3 than on 2 (The probability for) 2 should be ¼ 2 has a 90° angle but 1 and 3 both have obtuse angles **or** 135° each 2 has a 90° angle but the others are bigger 2 has a smaller area (the sections have) different sizes/angles/areas (the spinner is) not split equally (the angle for) 2 would be 120 not 90 (The angle for) 2 would be 120 or all angles would be 120 (landing on) 2 is less than a third the chances for the other two are higher than (for) 2 **Not acceptable:** Yes with any reason given No it should be $\frac{2}{3}$ (No because) 2 has a 90° angle the bigger the angle the more likely	
12	280	P1 P1 A1	for process to find the number of bars of white chocolate or milk chocolate, eg 24 ÷ 3 × 2 oe (= 16) or 24 ÷ 3 (= 8) **or** for process to work with total weight of chocolate, eg 24 × 35 (= 840) for complete process, eg (24 – "16") × 35 or "8" × 35 **or** "840" ÷ 3 cao	Allow use of 0.66.. or better **or** 0.33.. or better for both process marks Award P2 for an answer of 560

Paper: 1MA1/2F					
Question		**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
13	(a)	$6cd$	B1	for $6cd$ or $6dc$ or $cd6$ oe	Inclusion of × scores B0, eg $6 \times cd$ oe
	(b)	-5	M1	for $3 + 2 \times -4$ (= 3 – 8)	
			A1	cao	
14	(a)	12	M1	for method to find speed, eg $36 \div 3$ or $\frac{36}{3}$	Condone $36 \div (3 \times 60)$
			A1	cao	
	(b)	Yes with supporting figures	P1	for process to find time, eg $36 \div 16$ (= 2.25) or $36 \div 16 \times 60$ (= 135)	
			P1	for full process to find figures to compare, eg 3 + "2.25" (= 5.25) or 3 hours + "2 hours 15 mins" (= 5 hours 15 mins) **or** 5 hours 20 mins – "2 hours 15 mins" (= 3 hours 5 mins) **or** 5 hrs 20 mins – 3 hours (= 2 hrs 20 mins) **and** $36 \div 16$ (= 2.25)	
			C1	Yes with correct supporting figures, eg 5.25(hours) (and 5.33.. hours) or 5 hours 15 mins **or** 3 hours 5 mins **or** 2 hrs 20 mins **and** 2 hrs 15 mins oe	If units are provided they must be correct for their figures for the C mark
15		525	M1	for method to find the interest after one year, eg $3500 \times 2.5 \div 100$ (= 87.5) oe **or** 0.025×6 (= 0.15) oe **or** for a complete method, eg $3500 \times 2.5 \times 6 \div 100$ oe **or** for 4025 **or** 2975	May be implied by, eg 3587.5(0) Award M1 for 3500×1.025^n
			A1	cao	

Paper: 1MA1/2F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
16 (a)	170	B1	for answer in the range 167 to 173	
(b)	35	M1	for correctly using readings from the graph as a factor of 1000 from the grams scale, eg 200 × 5 or 100 × 10 or 20 × 50 or 250 × 4 **or** for method to use multiples of grams and corresponding ounces readings, eg 1000 ÷ "answer to (a)" × 6 **or** 1000 ÷ grams × ounces oe	May be seen as a build-up method using multiple readings that can be read from the graph but must total 1000 grams (ounces, grams) is a point on the line
		A1	for an answer in the range 34 to 36	
17	Region **R** shown	C1	for arc drawn, radius 4 cm, centre *A*	Allow free hand drawing
		C1	for perpendicular bisector of *CB* drawn	Allow free hand drawing
		C1	for fully correct region **R** shown (inside the arc from *A* and left of the bisector)	Ignore absence of "R" if region is unambiguously shown eg by shading
18	12	P1	for a beginning process, eg 1800 – (1800 × 0.56) oe or 1800 × (1 – 0.56) (= 792) or 1800 ÷ 100 × 56 ÷ 66 (= 15.272…) **or** 1800 ÷ 66 (=27.272…) **or** [44%] ÷ 66	[44%] is the value they clearly believe to be 44% of 1800
		P1	for a complete process, eg "792" ÷ 66 **or** "27.272…" × (1 – 0.56) oe **or** "27.272…" – "15.272…"	
		A1	cao	

Paper: 1MA1/2F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
19 (a)	0.517(0189759)	M1	for any correct partial calculation, eg 40.113 or 6.333(482454) or 12.25 **or** answer of 0.51 or 0.52 **or** digits 517…	
		A1	for 0.517(…)	Answer must be given to at least 3 decimal places rounded or truncated. Check first 3 significant figures only.
(b)	0.52	B1	for 0.52 **or** ft their answer to part (a) correctly rounded to 2 sf, provided part (a) has at least 3 sf	Do not accept trailing 0, eg 0.520
20	16.2	M1	for a correct first step to find *BC*, eg $19^2 = 10^2 + BC^2$ or $19^2 - 10^2$ (= 261) or $\sqrt{19^2 - 10^2}$ or $\sqrt{261}$ or $3\sqrt{29}$	Can use alternative letter for *BC* provided intention is clear If using an alternative method using trigonometry must have *BC* as the only unknown
		A1	for answer in the range 16.1 to 16.2	ISW incorrect rounding if answer given in range
21 (a)	$2 \times 3 \times 3 \times 5$	M1	for a complete method to find prime factors; could be shown on a complete factor tree with no more than one error **or** by division by prime factors with no more than one error **or** for 2, 3, 3, 5	Condone the inclusion of 1 for this mark
		A1	for $2 \times 3 \times 3 \times 5$ oe	Accept $2 \times 3^2 \times 5$
(b)	36	B1	for 36	Accept $2^2 \times 3^2$ or $2 \times 2 \times 3 \times 3$
22	4	M1	for method to use formula, eg $72 \div 6$ (= 12) or $72 \div 9$ (= 8)	Can be implied by $\frac{72}{6}$ or $\frac{72}{9}$
		A1	cao	

Paper: 1MA1/2F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
23	70	P1	for process to find number of discs in the bag, eg $24 \div 0.16$ (= 150) **or** for process to find the total probability of red or blue, eg $1 - 0.16$ $\left(=0.84 \text{ or } \frac{21}{25} \text{ oe}\right)$	May be implied by 126
		P1	for process to work with ratio, eg ([total] – 24) ÷ (5 + 4) (= 14) **or** for a process to find the probability of red, eg [probability] $\div (5+4) \times 5$ $\left(= 0.46\ldots \text{ or } \frac{7}{15}\right)$	0.46 or better or 0.47 may imply P2 [total] can be any integer [probability] can be any value less than 1
		P1	for a complete correct process to find the number of red discs, eg "14" × 5 **or** "0.46…" × 24 ÷ 0.16 **or** an answer of $\frac{70}{150}$	If correct processes seen to find the total for both red and blue or 70 : 56 award P3 Must come from correct use of probability and ratio in either order
		A1	for 70	If the values for red and blue are found, the value for red must be clearly identified as the answer to gain A1

PMT

Paper: 1MA1/2F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
24 (a)	(6) 2 (0) 0 (2) 6	B2	for all 3 values correct	
		(B1	for 1 or 2 correct values)	
(b)	Graph drawn	B2	for a fully correct graph	Accept a freehand curve drawn that is not made of line segments Ignore anything drawn outside the required range
		(B1	ft (dep on B1 in (a)) for plotting at least 5 of the points from their table correctly)	
(c)	–1.7 to –1.5 and 2.5 to 2.7	M1	for drawing the line $y = 4$ or reading off intersections where $y = 4$ **or** one correct solution **or** both solutions given as coordinates, eg (–1.6, 2.6) or (–1.6, 4) **and** (2.6, 4)	ft their graph for this mark Accept these coordinates reversed
		A1	for answers in the range –1.7 to –1.5 **and** 2.5 to 2.7 **or** ft their graph with at least 2 solutions	Algebraic methods score 0 marks

Paper: 1MA1/2F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
25	Yes, supported by correct figures	P1	for a process to find the number of sweets Tina gives to Andy, eg $14 \div 7 \times 3 (=6)$ **or** for a process to work with fractions of the total to find fraction given to Andy, eg $\frac{14}{21} \times \frac{3}{7} \left(= \frac{2}{7}\right)$ **or** for dividing a given number (eg 441) in the ratio 1 : 6 : 14 (= 21 : 126 : 294)	May work with an equivalent ratio, eg 21 : 126 : 294 and do $294 \div 7 \times 3 (=126)$ as a first step May work in multiples of x for all marks
		P1	for a process to find number for Andy and Tina after first exchange, eg A = 1 + "6" (=7) **and** T = 14 – "6" (=8) **or** for a process to find the number of sweets Tina gives to Luke eg ("14" – "6") $\times \frac{12.5}{100}$ (= 1) **or** for a process to work with fractions of the total to find fraction given to Luke, eg for $\frac{(14 - "6")}{21} \times \frac{12.5}{100}$ **or** process to work out the number of sweets given to Andy **and** Luke for their total, eg "294" ÷ 7 × 3 (= 126) **and** ("294" – "126") $\times \frac{12.5}{100}$ (= 21)	
		P1	for a process to find the final amounts or final shares for at least **two** of Andy, Luke and Tina eg two of 1 + "6" (= 7) , 6 + "1" (= 7) , 14 – "6" – "1" (= 7) **or** $\frac{1}{21} + \frac{"2"}{7} \left(= \frac{7}{21}\right), \frac{6}{21} + "\frac{1}{21}" \left(= \frac{7}{21}\right), \frac{14}{21} - "\frac{2}{7}" - "\frac{1}{21}" \left(= \frac{7}{21}\right)$ **or** "21" + "126" (= 147) , "126" + "21" (= 147) , "294" – "126" – "21" (= 147)	
		C1	Yes, supported by full working and accurate figures for Andy, Luke and Tina	Accurate figures with no supportive working scores 0

Paper: 1MA1/2F				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
26	Shown with reason given	M1	for deriving a suitable equation, eg $4x + 15 + 2x + 15 + 4x + 8 + 3x - 3 = 360$ or $13x + 35 = 360$ **or** $4x + 15 + 2x + 15 = 180$ or $6x + 30 = 180$ **or** $4x + 8 + 3x - 3 = 180$ or $7x + 5 = 180$	May be seen in an equation
		M1	(dep) for a method to isolate terms in x, eg $4x + 2x + 4x + 3x = 360 - 15 - 15 - 8 + 3$ **or** $4x + 2x = 180 - 15 - 15$ **or** $4x + 3x = 180 - 8 + 3$	
		A1	for solving equation to $x = 25$	
		C1	for substituting $x = 25$ into $A + B$ or $C + D$ and showing $= 180$, and gives a suitable statement, eg co-interior/allied angles (sum to 180), **or** since $A + B = 180$ the lines are parallel	If starting with an equation = 180 need to substitute into the opposite pair.
			Alternative solution assuming it is a trapezium	
	Shown	M1	for deriving a suitable equation, eg $4x + 15 + 2x + 15 = 4x + 8 + 3x - 3$ or $6x + 30 = 7x + 5$	
		M1	(dep) for a method to isolate terms in x, eg $15 + 15 - 8 + 3 = 4x + 3x - 4x - 2x$	
		A1	for solving equation to $x = 25$	
		C1	for a fully correct statement, eg since $A + B = 180$ the lines are parallel	
27	2	M1	for $\frac{1.5}{6}\left(=\frac{1}{4}\right)$ or $\frac{6}{1.5}$ $(= 4)$ or $\frac{8}{6}\left(=\frac{4}{3}\right)$ or $\frac{6}{8}\left(=\frac{3}{4}\right)$ oe	
		A1	cao	

Paper: 1MA1/2F

Question	Answer	Mark	Mark scheme	Additional guidance
28 (a)	$100 < w \leq 150$	B1	cao	
(b)	152	M1	for finding 5 products within the interval (including end points) with not more than one error, may be seen near table, eg 75×34 (= 2550), 125×29 (= 3625), 175×27 (= 4725), 225×19 (= 4275), 275×11 (= 3025) or for 18200	do not award this mark if the final answer comes from an alternative incorrect method, eg $120 \div 5$ (= 24) or $\Sigma mp \div \Sigma f$ ($875 \div 120$ (= 7.29…)) or $\Sigma mp \div 5$ ($875 \div 5$(= 175))
				Min *fx* / Max *fx* 1700 / 3400 2900 / 4350 4050 / 5400 3800 / 4750 2750 / 3300 15200 / 21200
		M1	for $\Sigma fx \div \Sigma f$ eg (“2550” + “3625” + “4725” + “4275” + “3025”) ÷ 120 or “18200” ÷ 120	Σfx must come from 5 products, *fx* within intervals (including end points)
		A1	for answer in the range 151 to 152	Correct midpoints must be used for the award of the A mark

PMT

Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 2F

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme. Notes apply to both MLP papers and Braille papers unless otherwise stated.

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

PMT

PAPER: 1MA1_2F			
Question		**Modification**	**Mark scheme notes**
1		Word 'five' added 'Write the following five numbers in order.'	Standard mark scheme
6		Diagram enlarged. Wording added 'Look at the diagram for Question 6 in the separate Diagram Booklet. The diagram is a pictogram.'	Standard mark scheme
	(b)	Sentence added 'A spare tactile diagram and drawing film are available for this question.'	
7	(a)	Horizontal line now of length 8.5 cm with a short vertical line added at each end. Wording added 'Look at the diagram for Question 7 (a) in the separate Diagram Booklet. The diagram shows a line.'	B1 for answer in the range 8 to 9
	(b)	Diagram turned horizontal. Angle x now 70° Wording added 'Look at the diagram for Question 7 (b) in the separate Diagram Booklet. The diagram shows an angle marked x.'	B1 for answer in the range 65 to 75
	(c)	For Braille only: Wording added 'Look at the diagram for Question 7 (c) in the separate Diagram Booklet. The diagram shows a shape. What is the name of this shape?' Braille candidates will have a diagram of a regular hexagon with 3 cm sides.	MLP: Standard mark scheme Braille: B1 for hexagon
8		Diagram enlarged. 1.5 cm grid. Crosses on grid changed to dots. Wording added 'Look at the diagram for Question 8 in the separate Diagram Booklet. The diagram is a coordinate grid.' For Braille: (c) changed to 'On the grid, mark with a bumpon the point with coordinates (-4, 2) Label this point C. A spare tactile diagram, bumpon and sticky label C are provided for this question.'	Standard mark scheme

11		Diagram enlarged. Wording added 'Look at the diagram for Question 11 in the separate Diagram Booklet. Majid has a spinner. The diagram shows the spinner with three sections labelled 1, 2 and 3.'	Standard mark scheme
13	(a) (b)	Letters changed: c changed to p and d changed to q Letter changed: x changed to w	Standard mark scheme but note the change in letters Standard mark scheme
16	 (a)	Diagram enlarged. Wording added 'Look at the diagram for Question 16 in the separate Diagram Booklet. The diagram shows a graph.' 6 ounces changed to 8 ounces.	 B1 for answer in the range 220 to 230
17		Diagram enlarged. CB now 12cm, AC now 8cm, and AB now 11cm. Add the sentences 'Look at the diagram for Question 17 in the separate Diagram Booklet. The diagram shows triangle ABC.' Wording changed "less than 4cm from A" changed to "less than 5cm from A" For Braille: sentence added 'A spare tactile diagram, Wikki Stix, drawing film and sticky label R are available for this question.'	Standard mark scheme but note change in radius of arc to be drawn from 4cm to 5cm
20		Diagram enlarged. Wording added 'Look at the diagram for Question 20 in the separate Diagram Booklet. The diagram is NOT accurately drawn. The diagram shows a right-angled triangle labelled ABC. In the diagram: AB = 10 cm AC = 19 cm'	Standard mark scheme
21	(b)	Word 'When' added Letters changed: A changed to T and B changed to U	Standard mark scheme

24	(a)	Word 'below' added to the sentence 'Complete the table below of values for …' For Braille: answer lines added Ans: (i) _____ (ii) _____ (iii) _____	Standard mark scheme
	(b)	Diagram enlarged. Wording added 'Look at the diagram for Question 24 (b) in the separate Diagram Booklet. The diagram shows a grid.' For Braille: sentence added 'A spare tactile diagram and bumpons are provided for this question.'	Standard mark scheme
26		Diagram enlarged. Labelling of trapezium changed from ABCD to DABC. Top left now A – top right now B – bottom right now C and bottom left now D. Letter changed: x changed to y Wording added 'Look at the diagram for Question 26 in the separate Diagram Booklet. The diagram is NOT accurately drawn. The diagram shows a quadrilateral labelled ABCD. In the diagram:' All angles are measured in degrees. Angle ABC = 4y + 8 Angle BCD = 3y – 3 Angle CDA = 2y + 15 Angle DAB = 4y + 15'	Standard mark scheme but note the changes in the vertices and the change from x to y
27		Diagrams enlarged. Labelling of triangles changed - ABC now ACB, DEF now DFE. Wording added 'Look at the diagram for Question 27 in the separate Diagram Booklet. The diagrams are NOT accurately drawn. The diagram shows two similar isosceles triangles labelled ABC and DEF. In triangle ABC: AB = 8 cm AC = 8 cm CB = 6 cm In triangle DEF: DE = DF FE = 1.5 cm'	Standard mark scheme

PMT

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Question 4

This was well answered with the majority of students being awarded the mark. However, some incorrect answers were seen and 25 was a common incorrect answer.

Question 24

This question was attempted by almost all students and some fully correct answers were seen. The modal mark was however one.

Very few students listed all factor pairs successfully but most were able to find at least 4 correct factors of both 72 and 90. Many found prime factors but were not able to translate this into a correct final answer.

The most successful students were those who used prime factor decomposition and a Venn diagram. There was still a bit of confusion between factors and multiples here with the LCM of 360 given as the answer. 6 and 9 were common answers, often without any indication of working out.

Question 3

Only a very few students made any errors in this question. Incorrect factors of 9 and 10 were sometimes seen. A few students listed multiples of 15 by mistake.

Question 2

The majority of students gave either 48 or 56 (or both) as their answer. Some gave multiples that were not within the stated range.

Question 20

Many students made a good start to this question by either starting with a prime factor decomposition of at least one of the numbers 108 and 120 or by writing down multiples of each of the numbers. Some allowance was made for arithmetic errors and students who used one of these two approaches generally scored at least one mark. Students who listed multiples were more likely to obtain full marks than those who used prime factor decomposition. It did seem that students who used the latter approach lacked confidence in how to use their products of prime factors to find the lowest common multiple. Final incorrect answers of 2 (lowest common factor) and 12 (highest common factor) were often seen.

Question 1

The one mark was awarded for students being able to find two different factors of 12. Most students were successful either listing factors or writing a pair as a product. Those who didn't gain the mark had usually mixed up the word factor with multiple.

Question 4

Another well answered question; most students scored the mark.

Question 20

The Venn diagram question was answered really well by many students and the award of three or four marks was common. Generally speaking a good proportion of students were able to score at least three marks, normally for a correctly labelled diagram with at least 2 regions correct. When mistakes were made, it was often from values in more than one region, or quite commonly, for the region $(A \cup B)'$ to be either incomplete, or containing all the values.

Question 2

Very few errors at all here.

Question 12

This question was not as well answered as anticipated. Students often included numbers other than the two prime numbers, 23 and 29, in their responses. The popular incorrect values being either 21, 25 or 27. A few students failed to understand the idea of a code and just gave the two prime numbers. This gained a mark. Some students failed to give the code in the required form of 'a letter followed by a number'. A few students listed all the numbers between 20 and 30 and so gave far too many combinations. Students are encouraged to read questions carefully and note the mark tariff for a question as this will give an indication of the amount of work required per question

Question 21

The use of a factor tree was the most common method used in this question for both parts.
Some students included a factor of 1 which was condoned in the factor tree but not in the final answer. Too many students had a correct factor tree but then lost a mark by failing to represent the answer correctly. They often just wrote 2,2,3,7 or 2+2+3+7 on the answer line instead of $2\times2\times3\times7$. The most common error seen in part (a) was to leave 21 as a final part of the factor tree and consider this as a prime number. As 21 is only 3×7 this was a surprising common misconception.

In part (b) a common mistake was to consider factors instead of multiples. Several students drew the factor tree for 60 correctly but then did not know how to use the prime factors of the two numbers to find the LCM. The use of the same factor tree in part (a) and part (b) was allowed as follow through if the same error was repeated. The most successful way of answering this question was when students listed the multiples of the two numbers and correctly selected the lowest common number in the list.

Question 22

In part (a) the principles underlying Venn diagrams seemed to be well understood, with the vast majority of students able to place some elements in the correct regions, with the modal mark for this part of the question being two marks. The main errors seen were incorrectly placing "1" and forgetting to place 3, 7, 9 outside the intersecting circles.

In part (b) students were again quite successful, with a majority gaining at least one mark, usually for $x/10$ but x was often not 2 nor did it relate to their diagram. Many students seemed to show an understanding of what was meant by the intersection symbol and were thus able to gain at least one if not two marks for this part of the question.

Question 6

In this question part (b) was more often correct than part (a).

In part (b) almost all answers were correct with just a few students giving 16 as an answer. Whilst this is a multiple of 8 it was not in the given list. However, for part (a) a wide range of incorrect answers were given using numbers from the list and it was disappointing to see that almost a third of the cohort could not recognise 25 as a square number.

Question 22

The majority of responses to the first part of this question scored at least one mark and a good proportion gave the correct answer of 12.

When one mark was gained it was for the sight of one or both factor trees, but some students did not know how to use the results and so did not go on to gain the accuracy mark.

The most successful method seemed to be listing factors and extracting 12 from the list.

Part (b) was not so well answered but as with part (a), many students gained a method mark for a factor tree, but then were unable to use the results correctly. The most successful responses were from those who listed multiples of 24 and 40. A few students did confuse HCF and LCM.

Question 2

Another well answered question. Where the mark was not gained by a small minority of students, values such as 2 and 3.5 were given. Some students wrote factors as paired products, which was acceptable.

Question 24

Many students gained at least one mark here for correctly identifying the prime factors of 124, usually by way of a factor tree diagram. However, so many failed to write these as a product. Many students faltered on their first factorisation, pairings of 2 and 64 being a common mistake. Of the students who completed the factor tree correctly, many then only wrote '2×2' and seemed put off by '31' as a prime factor (many then attempting to split 31 further, obviously unsuccessfully).

Question 4

Well over 90% of the cohort was able to answer this question correctly. The errors seen were to not give a 3-digit number or to give the first 3 multiples of 5.

Question 3

Most students answered this factors question correctly with many giving more than the requested two factors. This still gained full marks as did writing their answer as factors pairs being multiplied together. The most common incorrect answer was students giving multiples instead of factors.

Question 21

Those who had a clear idea of LCM usually wrote a list of multiples of 24 and 56 until they found the first multiple in common which was 168. This was the most successful method used, which usually resulted in the award of full marks.
The other approaches were linked to the derivation of prime factors, using a variety of factor trees, Venn diagrams or tables, sometimes more than one. Whilst these were usually correctly presented for 1 mark, students rarely knew how to find the LCM from their prime factors, though Venn diagrams were sometimes successfully used.

Question 5

A well answered question.

Question 7

Whilst, on the whole, this question was answered well, many students did try to over complicate their solutions by first constructing factor trees and some even giving 20 as a product of its prime factors; $2^2 \times 5$ or $2 \times 2 \times 5$, both of which earned one mark for identifying two correct factors. Product pairs were often seen, eg 4×5, etc. and these were an acceptable alternative way of identifying the factors of 20. Some students listed multiples of 20 failing to understand what a factor was.

Question 5

This question was answered correctly by almost all students.

Question 21

Around half of the cohort were successful in writing the value correctly as a product of prime factors and gaining the two marks available in this standard and familiar question.
As with previous series, the most common reason for the loss of marks was due to writing factor pairs instead of finding prime factors, gaining no credit, or finding the prime factors but not writing these as a product. Listing the correct prime factors using commas or as an addition gained the method mark only.
A number of students made careless arithmetic errors when writing their factor tree such as $6 = 3 \times 3$ or $10 = 5 \times 5$ and quite a few left 15 at the end of a branch, resulting in an incomplete factor tree which scored no marks. Some students included 1s in their factor trees, which was acceptable for the method mark, but not for the accuracy mark. However, this was less frequently seen than in previous series which is encouraging.

Question 24

Most candidates struggled to access this question. Many confused the two skills and some stated the multiple as the factor and vice versa, confused by the terms "lowest" and "highest". At this level the numbers chosen for this problem also hindered candidates further. Hardly any tried to find factor pairs for part (a), however some did start to list multiples to find the solution for the second part. In part (b) most were rewarded with the method mark, but not many went far enough, or without error, to arrive at the solution of 15876. It was pleasing to see that more candidates, than in previous sessions, chose to utilise Venn diagrams and prime factor decomposition to solve these two questions. However, again many confused the two skills, and many were unable to use their Venn diagram to actually arrive at the two solutions required. Common incorrect answers were 7 in part (a), using the highest prime factor, and 3 in part (b) using the lowest prime factor. Those who gained full marks mostly did so using the Venn diagram method, rather than listing multiples.

Question 1

A good accessible start to the paper with this question being well answered with most students scoring the mark.

Question 4

This question requiring the identification of a multiple between two given values was answered correctly by most of the cohort. When the mark wasn't awarded, it was often due to including more than one value, some of which were not multiples of 7.

Question 21

Writing a number as a product of prime factors in part (a) is a familiar and standard question that was answered perfectly by a significant number of students. The most commonly seen method was to use a factor tree, with many showing a complete tree, some including 1 on their tree which still allowed for at least the method mark to be awarded but some not completing the factorisation for 9. When all of the prime factors had been found, some went on to correctly write as a product, some wrote as a product but included 1 which was not condoned for the accuracy mark and some either wrote their answer as a list or as an addition calculation. When a mark was not awarded, it was often due to listing single factors or factor pairs of 90. It was rare to see more than one error in factor trees compared to previous series which was pleasing.

There was less success in part (b) with the majority of students being unable to find the LCM of two values written as prime factor products. The most successful approach came from listing multiples of 12 and 18. When the mark was not awarded it was often due to candidates not knowing what to do with 12 and 18 or finding the HCF instead of the LCM. The use of Venn diagrams was rare but when used often led to a correct answer.

Question 8

This question saw a majority of students gain the full 3 marks. There were various ways students could achieve a correct solution and all were seen. The most common method being to find the year that Aisha turned 18 (2011) and then count up in 5's until reaching 2026 or 2031 and arriving at an answer of 'no'. Some students found the difference between 2011 and 2030 (19)

and explained or showed that 19 was not divisible by 5, which was enough to gain 3 marks - although some that found 19 missed the final mark because they did not state that 19 is not divisible by 5. Some found the difference between 2030 and 1993 but then didn't know how to work with it to gain the rest of the marks. A minority of students gained 0 marks, with the most common incorrect process seen being to start at 1993 and count up in multiples of 5. Some attempted to find the year she was 18 by repeated addition but included 1993 so ended up with an answer of 2010.

Question 12

This question saw mixed results with a minority to gain 2 marks for 3 correct prime numbers. Of those that weren't awarded full marks, some gained 1 mark for 2 out of 3 correct prime numbers. Many were only able to give 1 prime number or in some cases none at all; common incorrect prime numbers were 21, 25, 27 and 39. Few students demonstrated good strategies to identify prime numbers, either by using the times tables or by tests of divisibility.

Question 22

The full range of marks out of 3 were awarded for this question. Some students were able to gain 2 marks for a correct answer of 21; the most common methods seen were to find the factors of 63 and 105 or to find the prime factors of 63 and 105 and go from there, sometimes listing the product of prime factors and on other occasions a Venn diagram. Of those that didn't gain 2 marks, a good number gained 1 mark, often for an answer of 3 or 7 or for the correct prime factors of 63 and/or 105. Many found 3 and 7, then chose 7 as their final answer as the highest common factor of the two. The most common incorrect method seen was to find the LCM of 63 and 105 by listing multiples.

Question 4

Learners were generally able to write down the multiple of 9 that is between 20 and 30 as was required for this question. Incorrect answers were generally numbers between 20 and 30 that were not the required multiple of 9.

Question 3

This question was answered well with most learners able to gain B1 for 2 correct factors. A good number gave more than 2 factors which was allowed as long as they were all correct. Common incorrect answers were 2,3 and 4,4.

Question 16

Part (a) saw a good number of learners score 2 marks for a correct answer. Of those that didn't, it was common to see an incomplete factor tree (e.g. one that does not have prime numbers at the bottom of the branches) or a lack of understanding as to what is meant by prime factors. Part (b) saw 0, 1 and 2 marks awarded in almost equal measure. Of those that did not gain 2 marks, many gained 1 mark, usually for correctly identifying the prime factors of 210 or for an answer in the SCB1 list (2, 3, 6, 7, 14, 21). Some learners found the Lowest Common Multiple by listing multiples, gaining 0 marks.

Question 4

Learners were generally able to identify the multiple of 8 that is between 25 and 35. Where the correct answer was not given common incorrect answers were 24 or involved giving the correct multiple of 8 together with a multiple of 8 that was outside the required range.

Question 19

In this question learners were asked to find the highest common factor (HCF) of 54 and 120. Many learners were confident in doing this and were able to find the correct answer of 6 following from either a consideration of the factors of each number or from correct factor trees. Where errors were seen these were often slips in the factor trees or inclusion of incorrect factors in the attempted lists, however it was often still possible for learners to gain 1 mark. It was also common to award 1 mark for an answer of 2 or 3 which were common factors, but not the highest common factor. The most common answers which did not gain credit followed from attempts to find lowest common multiple of the two numbers, although some of these attempts did gain 1 mark where a factor tree was completed.

Question 20

Responses to part (a) showed a variety of approaches of prime factor decomposition, including factor trees and 'ladders'. If learners are able to work accurately with their chosen method they can gain full marks, with many doing so. The use of factor trees was the most common and often most successful approach. When an incorrect final answer was given, the first mark was often earned for attempting to find prime factors, possibly containing one error which was allowed, but the method did have do go all the way to prime numbers, condoning the use of 1s, to gain this mark. After reaching 2, 5, 5, 5, learners needed to show these prime factors as a product to gain the accuracy mark, either as a full product or in a simplified form using indices. Those who left them as a list with commas or spaces or wrote as an addition only gained the method mark. Some arithmetic errors were seen but when no marks were awarded, it was often due to not showing a full method to find prime factors such as stopping at 25 and not continuing to find 5 and 5.

In part (b), a number of approaches to finding the lowest common multiple were seen such as building up in multiples of 25 and 30, which often led to the correct answer. When the method used was to write prime factors in a Venn diagram, learners did not always know how to deal with them to reach the answer. It seemed to be common for learners to have misinterpreted the question as asking for the highest common factor, with an answer of 5 regularly being seen, particularly when listing factor pairs which only gained credit if the common factors of 5, 5 and 6 were clearly identified as these could then be used to find the correct answer.

Question 5

For responses that gained B1, a variety of correct factor pairs were provided. In some cases, more than two factors were listed; this was accepted as long as all factors given were correct. Some responses presented the pair of factors as a product, which was also accepted. The most common incorrect responses included pairs of multiples of 32 or pairs of numbers with a sum of 32.

Pearson Edexcel

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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Examiners' Report

Principal Examiner Feedback

November 2023

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

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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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