

United Learning

AQA GCSE Mathematics
1MA1

Higher Tier

Targeting Grade 7+

Booklet 3 MS

Non-Calculator



Qu 1

11(a)	5.15	B1	
	5.25	B1	
	Additional Guidance		

11(b)	20.6	B1ft	ft 4 × their 5.15
	21	B1ft	ft 4 × their 5.25

Qu 2

12	Any two of 0.5, 40 and 100	M1	1600 implies 40 10 implies 100
	(40 ² =) 1600 or (0.5 × 40 ² =) 800 or (√100 =) 10	M1	
	80 with correct working	A1	
	Additional Guidance		
	$\frac{0.5 \times 1600}{\sqrt{100}}$ or $\frac{0.5 \times 40^2}{10}$ or $\frac{1 \times 1600}{10}$ or $\frac{800}{\sqrt{100}}$ or $\frac{800}{10}$		M1M1
	80 with no or incorrect working, eg attempt at actual calculation and then rounding to 80		M0M0A0
	Condone 0.50(0) for 0.5, 40.0(0) for 40 and 100.0(0) for 100 etc		
	Rounding 0.526 to 1, but otherwise correct, with answer 160		M1M1A0

Qu 3

12(a)	$2w - 3 = 24$	M1	
	$2w = 24 + 3$ or $2w = 27$	M1dep	
	13.5	A1	<u>oe</u>
	Additional Guidance		

12(b)	$x^2 - \frac{25}{4} < 0$ or $4x^2 < 25$ or $(2x - 5)(2x + 5) < 0$	M1	
	$x^2 < \frac{25}{4}$ or 2.5 or -2.5 seen	M1dep	
	$-2.5 < x < 2.5$	A1	<u>oe</u>
	Additional Guidance		

12(c)	$1 = 5(y - 6)$ or $1 = 5y - 30$	M1	
	$1 + 30 = 5y$ or $31 = 5y$ or $\frac{1}{5} = y - 6$	M1dep	
	$\frac{31}{5}$	A1	<u>oe</u>

Qu 4

13	Alternative method 1			
	$88 \div (7 + 4)$ or $88 \div 11$ or 8	M1	oe $11 \times 8 = 88$	
	their 8×7 and their 8×4 or their 8×7 and $88 -$ their value or their 8×4 and $88 -$ their value or 56 and 32 or their $8 \times (7 - 4)$ or their 8×3	M1dep	oe eg $8 \times 7 = 63$ and $88 - 63$ eg $8 \times 4 = 30$ and $88 - 30$	
	24	A1		
	Alternative method 2			
	One correctly evaluated trial for two numbers, other than 7 and 4, in the ratio 7 : 4	M1	eg $70 + 40 = 110$	
	56 and 32	M1dep	eg $56 + 32 = 88$	
	24	A1		
	Alternative method 3 using $x : y = 7 : 4$ (correct)			
	$4x = 7y$ and $4x + 4y = 352$	$4x = 7y$ and $7x + 7y = 616$	M1	oe forming equation from ratio and equating coefficients
	$11y = 352$ or $y = 32$	$11x = 616$ or $x = 56$	M1dep	oe equation in one variable
	24	A1		
	Alternative method 4 using $x : y = 4 : 7$ (incorrect)			
	$7x = 4y$ and $4x + 4y = 352$	$7x = 4y$ and $7x + 7y = 616$	M1	oe forming equation from ratio and equating coefficients
	$11x = 352$ or $x = 32$	$11y = 616$ or $y = 56$	M1dep	oe equation in one variable
their answer	A0			

Qu 5

13(a)	$\frac{1}{2}$	B1	
	Additional Guidance		
13(b)	$(b^2 =) 5^2 + 8^2 - 2 \times 5 \times 8 \times \cos 60$	M1	
	$(b^2 =) 25 + 64 - 40$	M1dep	
	$b^2 = 49$ so $b = 7$	A1	

Qu 6

13(a)	0.64	B1	
13(b)	$\frac{x}{4} = \cos 50^\circ$ or $\frac{x}{4} = \text{their } 0.64$ or $4 \times \text{their } 0.64$	M1	oe their 0.64 from (a)
	2.6	A1ft	oe ft their 0.64 from (a)

Qu 7

14(a)	0.16 + 0.24 + 0.16 + 0.24 or 0.8(0)	M1	
	0.2	A1	oe
14(b)	0.4(0)	B1	
14(c)	Alternative method 1		
	4 ÷ 0.16 or 1 number ↔ 0.04	M1	oe
	25	A1	oe
	Alternative method 2		
	$\frac{0.24}{0.16} \times 4$ or 6 or $\frac{\text{their } x}{0.16} \times 4$ or 5	M1	oe Attempt to work out how many prime numbers in the range $361 \leq n < 390$ or $421 \leq n < 450$ or $331 \leq n < 360$
25	A1		

Qu 8

15	$1\frac{3}{4} \div 5\frac{5}{6}$ or $\frac{7}{4}$ and $\frac{35}{6}$	M1	oe eg $\frac{42}{24}$ and $\frac{140}{24}$
	$\frac{7}{4} \div \frac{35}{6}$ or $\frac{7}{4} \times \frac{6}{35}$ or $\frac{6}{20}$	M1	oe unsimplified correct fraction
	$\frac{3}{10}$	A1	

Qu 9

16	$70 \div 5 (\times 4)$ or 14 or 56	M1	oe
	56 in W only and 14 in B only	A1	
	their $56 + x = 3(\text{their } 14 + x)$ or their $56 + x = \text{their } 42 + 3x$	M1	oe any letter
	7 in W and B	A1ft	ft their 56 and their 14 Award if W total = $3 \times$ B total
	23 not in W or B	B1ft	ft their 56 and their 14 and 7 Award if the four values total 100

Qu 10

17	$3x^2 - 6x + x - 2$ or $3x^2 - 5x - 2$	M1	4 terms with at least 3 correct
	$3x^2 + (a - \text{their } 5)x - \text{their } 2 + b$ or $a - \text{their } 5 = 8$ or $b - \text{their } 2 = -5$	M1	
	$a = 13$	A1	
	$b = -3$	A1	
	Additional Guidance		
	$a - \text{their } 5 = 8, a = 13$		M1A1
	$a - \text{their } 5 = 8, a = 13$ and $b - 2 = -5, b = -3$		M1A1M1A1
	$13x - 3$		M1A1M1A1

Qu 11

Alternative method 1		
$\frac{9}{15}$ or 0.6 or $\frac{24}{15}$ or 1.6	M1	oe
$\frac{9}{15} \times 24$ or $\frac{24}{15} \times 9$ or 14.4(0)	M1dep	oe
their 14.4(0) + 189 or 203.4(0)	M1	11 - 189
203.4(0) and Yes	A1	11 and 14.4(0) and Yes or ($11 \div \frac{9}{15} =$) 18.3(3...) and Yes

17

Alternative method 2		
200 - 189 or 11	M1	
$\frac{9}{15}$ or 0.6 or $\frac{24}{15}$ or 1.6	M1	oe
$\frac{9}{15} \times 24$ or $\frac{24}{15} \times 9$ or 14.4(0) or $11 \div \frac{9}{15}$ or 18.3(3...)	M1dep	oe
11 and 14.4(0) and Yes or 18.3(3...) and Yes	A1	

Qu 12

18

(19, 9)	B1	$\frac{15 + 23}{2} = 19$ or $\frac{6 + 12}{2} = 9$
(31 - their 19) $\times \frac{2}{3}$ or 8 or (their 9 - 3) $\times \frac{2}{3}$ or 4	M1	
their 19 - 8 or 11 or their 9 + 4 or 13	M1	
(11, 13)	A1	

Qu 13

18	At least 1 point from (-2, 8) (-1, -1) (0, -4) (1, -1) (2, 8) (3, 23) (4, 44)	M1	Seen or implied If only seen plotted allow ± 0.5 square	
	At least 3 correct points from (-2, 8) (-1, -1) (0, -4) (1, -1) (2, 8) plotted correctly (± 0.5 square) and attempt to join their points with a smooth curve (± 0.5 square)	M1		
	[-0.75, -0.95]	A1		
	[1.45, 1.65]	A1		
	Additional Guidance			
	For first M1 allow (3, 23) or (4, 44) even though they cannot be plotted			

Qu 14

19	1.1 or 0.8	M1	May be implied
	$1.1^2 \times 0.8$	M1	oe
	0.968 or 96.8(%) or 0.032 or 3.2%	A1	
	3.2 % decrease	A1ft	ft their 0.968 with both method marks awarded

Qu 15

20	$\frac{1}{3}$	B1	
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Qu 16

21(a)	Ticks No and gives valid reason	B1	Examples of valid reasons: translation (by $\begin{pmatrix} 6 \\ 0 \end{pmatrix}$) $\begin{pmatrix} 6 \\ 0 \end{pmatrix}$ or $\begin{pmatrix} 6 \\ 0 \end{pmatrix}$ or (6, 0) rotation (of 180°), (centre (0, 2.5)) enlargement (of scale factor) -1 (about (0, 2.5))
	Additional Guidance		
	Full descriptions are not needed, but if given must be correct For the enlargement, the scale factor of -1 must be given		
	Transformation (6, 0)		B1
	Moved 6 to the right		B1
	Moved 6 squares		B0
	Condone 'turn' with full description of 180°, (centre) (0, 2.5)		B1
	2 or more single transformations given, with at least 1 correct		B1

21(b)	Enlargement, scale factor -2, centre (-1, 0)	B3	B2 Enlargement, scale factor -2 or enlargement centre (-1, 0) or scale factor -2, centre (-1, 0) B1 (Triangle with) vertices at (0, -1) (0, -3) and (3, -2) or enlargement or scale factor -2 or scale factor 2
	Additional Guidance		
	'Scale factor' and 'centre' may be implied eg enlargement, -2, (-1, 0)		B3
	Allow '-1 on the x-axis' for (-1, 0)		
	No triangle on diagram, but vertices stated as coordinates and no other marks awarded		B1
	A combination of transformations can score a maximum of 1 mark for the triangle drawn or vertices identified		
	Correct triangle drawn and 'enlargement', with no other marks awarded		B1
Enlargement, (scale factor) $-\frac{1}{2}$, centre (-1, 0)		B2	

Qu 17

22	$\frac{QS}{PT}$	B1	
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Qu 18

22	0.8×10 or 8 or 1.6×20 or 32 or 2.2×10 or 22 or 2×5 or 10	M1	Any one $fd \times$ class width
	$0.8 \times 10 + 1.6 \times 20 + 2.2 \times 10$ + 2×5 or $8 + 32 + 22 + 10$	M1dep	oe
	72	A1	

Qu 19

23(a)	[6, 6.5]	B1	
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23(b)	Alternative method 1		
	$\frac{1}{2} \times (22 + 18) \times (25 - 10)$ or $15 \times 18 + \frac{1}{2} \times 15 \times 4$	M1	oe
	300	A1	
	Alternative method 2		
	20×15	M1	
	300	A1	
	Additional Guidance		
	Alternative method 2 uses average velocity \times time		

Qu 20

24(a)	0.6 or $\frac{3}{5}$	B1	oe fraction Accept 36 m/s per min
	m/s^2	B1	oe Accept m/s per min only if their acceleration is 36 m/s per min
24(b)	Chord from (0, 0) to (50, 30) and attempt at tangent to curve that is parallel to chord	M1	
	[11, 14]	A1	Must see working on the graph