

United Learning

AQA GCSE Mathematics
1MA1

Higher Tier

Targeting Grade 7+

Booklet 2 MS

Calculator



Qu 1

7	Alternative method 1		
	$5200 = 0.2(E - 10\ 600)$	M1	oe
	$5200 \div 0.2$ or 26 000	M1dep	oe 5200×5
	36 600	A1	
	Alternative method 2		
	$5200 = 0.2(E - 10\ 600)$	M1	oe
	$5200 + 0.2 \times 10600$ or $5200 + 2120$ or 7320	M1dep	
	36 600	A1	

Qu 2

7	$\sin 20 = \frac{x}{12}$ or $12 \sin 20$	M1	oe
	4.1...	A1	Accept 4 with working shown

Qu 3

8	5.5 and -5.5	B2	oe B1 for each
	Additional Guidance		
	± 5.5		B2

Qu 4

8	$2 (\times) 70$ or $5 (\times) 28$ or $7 (\times) 20$	M1	May be on a diagram
	$2 \times 2 \times 5 \times 7$	A1	Any order
	$2^2 \times 5 \times 7$	A1	Any order

Qu 5

9

Alternative method 1		
$10\frac{1}{2} \div \frac{7}{1000}$ or 1500	M1	oe
their $1500 \div 3 \times 2$	M1	oe
1000	A1	SC1 100 or 10 000
Alternative method 2		
$10\frac{1}{2} \div 3 \times 2$ or 7	M1	oe eg $10\frac{1}{2} : 7$
their $7 \div \frac{7}{1000}$	M1	oe
1000	A1	SC1 100 or 10 000
Alternative method 3		
$\frac{1000}{7} \div 3 \times 2$ or [95.2, 95.4]	M1	oe
$10.5 \times$ their [95.2, 95.4]	M1	
1000	A1	SC1 100 or 10 000

Qu 6

9

$3a - 4 = 11$	M1	oe $11 + 4$
$3a = 11 + 4$ or $3a = 15$ or $a = 5$	M1dep	oe $\frac{11 + 4}{3}$
$6 - 4b = 14$	M1	oe $14 - 6$ or $6 - 14$
$4b = 6 - 14$ or $4b = -8$	M1dep	oe $\frac{6 - 14}{4}$
$a = 5$ and $b = -2$	A1	

Qu 7

10	2.5(0) × 11 or 27.5(0) or 7.5(0) × 7 or 52.5(0) or 12.5(0) × 2 or 25	M1	
	their 27.5(0) + their 52.5(0) + their 25 or 105	M1dep	sum of fx
	their 105 ÷ 20 or 5.25	M1dep	
	5.25 and correct conclusion	A1	oe eg 5.25 and women gave more
Additional Guidance			
105 ÷ 3 = 35			M1M1M0A0

Qu 8

11	Alternative method 1		
	States or implies that 2 is one third of 6 and States or implies that 5 is one third of 15 and 180 ÷ 3 = 60 or 60 × 3 = 180 and Yes	B2	B1 for states or implies that 2 is one third of 6 or states or implies that 5 is one third of 15 or 180 ÷ 3 = 60 or 60 × 3 = 180
	Alternative method 2		
	180 ÷ (1 + 2 + 3) × 2 = 60 or 180 ÷ 6 × 2 = 60 and 180 ÷ (4 + 5 + 6) × 5 = 60 or 180 ÷ 15 × 5 = 60 and Yes	B2	B1 for 180 ÷ (1 + 2 + 3) × 2 = 60 or 180 ÷ 6 × 2 = 60 or 180 ÷ (4 + 5 + 6) × 5 = 60 or 180 ÷ 15 × 5 = 60
	Alternative method 3		
	30° and 60° and 90° and 48° and 60° and 72° and Yes		B1 for 30° and 60° and 90° or 48° and 60° and 72°

Qu 9

12	$\frac{y}{x+y}$	B1
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Qu 10

Alternative method 1		
13	Valid number of bread rolls and cheese slices	M1 eg 30 bread and 60 cheese or 60 bread and 120 cheese or 90 bread and 180 cheese or 120 bread and 240 cheese Valid number means ratio 1 : 2 and can be bought in exact numbers of packs May be implied by valid number of packs
	Valid number of packs of bread rolls and cheese slices	M1dep eg 2 packs bread and 3 packs cheese or 4 packs bread and 6 packs cheese or 6 packs bread and 9 packs cheese or 8 packs bread and 12 packs cheese Valid number of packs means ratio 2 : 3
	their number of packs of bread \times 1.88 and their number of packs of cheese \times 2.15	M1dep eg 15.04 and 25.8(0)
	40.84	A1 SC2 27.94 or 42.98

13
cont

Alternative method 2		
Valid number of sandwiches	M1	eg Common multiple of 15 and 20 identified eg 15 30 45 <u>60</u> 75 and 20 40 <u>60</u> Valid number means can be bought in exact numbers of packs
$1.88 \div 15 + 2.15 \div 10$ or $0.125(\dots) + 0.215$ or $0.34(0\dots)$	M1	oe Cost of one sandwich
their $0.34(0\dots) \times$ their number of sandwiches	M1dep	dep on M2
40.84	A1	SC2 27.94 or 42.98
Additional Guidance		
Alt 1 3rd M1 Allow working in pence		
Alt 2 2nd M1 Allow working in pence		
30 bread and 60 cheese/2 packs bread and 3 packs cheese 2×1.88 or 3.76 and 3×2.15 or 6.45 (Answer £10.21)		M3 A0
60 bread and 120 cheese/4 packs bread and 6 packs cheese 4×1.88 or 7.52 and 6×2.15 or 12.9(0) (Answer £20.42)		M3 A0
90 bread and 180 cheese/6 packs bread and 9 packs cheese 6×1.88 or 11.28 and 9×2.15 or 19.35 (Answer £30.63)		M3 A0
150 bread and 300 cheese/10 packs bread and 15 packs cheese 10×1.88 or 18.8(0) and 15×2.15 or 32.25 (Answer £51.05)		M3 A0
SC2 from 120 bread and 120 cheese or 240 bread and 120 cheese		

Qu 11

	$C = 0.6(0)n + 2.5(0)$	B3	oe Must have $C =$ for B3 B2 $C = 0.6n + k$ ($k \neq 0$) or $C = an + 2.5$ ($a \neq 0$) or $0.6n + 2.5$ B1 $0.6n$ or $an + 2.5$ ($a \neq 0$) or $C = 60n + 250$
Additional Guidance			
	Allow correct fractions eg $\frac{3}{5}$ or $\frac{1}{1.6}$ for 0.6 and/or $\frac{5}{2}$ for 2.5		
	Allow $0.6 \times n$ or $n \times 0.6$ for $0.6n$ eg $C = 0.6 \times n + 2.5$ $n \times 0.6 + 2.5$ $0.6 \times n$	B3 B2 B1	
14	Penalise by one mark the use of $n0.6$ for $0.6n$ eg $C = n0.6 + 2.5$ $n0.6 + 2.5$ $n0.6$	B2 B1 B0	
	Penalise by one mark the use of different letters eg $y = 0.6x + 2.5$ $0.6x + 2.5$ $2p + 2.5$	B2 B1 B0	
	Transposing 0.6 and 2.5 scores zero eg $C = 2.5n + 0.6$	B0	
	Ignore £ signs eg $£C = £0.6n + £2.5$ or $C = £0.60n + £2.5$	B3	
	$C = 1.2n + 2.5$	B2	
	$1.2n + 2.5$	B1	
	$C = 0.6n + 2.5$ in working with $0.6n + 2.5$ on answer line	B3	

Qu 12

15(a)	Identifies error in working	B1	eg $2y^2$ should be $4y^2$ 2 should be 4 2 should be squared Should have worked out $(2y)^2$ but has only worked out y^2
	Additional Guidance		
	Answer may be seen next to Sami's method below the diagram		
	Adding brackets around $2y$ to Sami's working in line 2 (working lines may be blank)	B1	
	Showing the error being corrected eg1 $(2y)^2 = 100$ and $2y = 10$ eg2 $4y^2 = 36 + 64$	B1 B1	
	She hasn't squared the bracket	B1	
	Has only squared y	B1	
	The brackets have been left out	B1	
	$(2y)^2$ is not equal to $2y^2$	B1	
	Should have square rooted 100 before dividing by 2 because the $2y$ should not have been taken out of the bracket	B1	
	Should have square rooted 100 before dividing by 2 (could be referring to working from line 3 to line 4)	B0	
	Line 2 is wrong (has not identified which part of line 2 is wrong)	B0	
	Answer should be $y = 5$ (has not shown what the error is)	B0	
	Ignore non-contradictory work if correct response seen		

15(b)	No and valid reason	B1	eg No and the hypotenuse is 10 No and $2y$ is 10 No and if you double y it is more than 8
	Additional Guidance		
	Valid reason must be for Mel's argument		
	Neither box ticked with valid reason can score B1 if decision in words eg $2y$ is 10 so Mel is wrong		B1
	No and she didn't double it to 10		B1
	No and she didn't double y		B0
	No and she has to double 5 which makes it 10		B1
	No and she has to double 5		B0
	No and the hypotenuse is $2y$ so that's more than 8		B1
	No and the hypotenuse is $2y$		B0
	No and the hypotenuse is the longest side		B0
	No and y is 5		B0
	No and if you double y it is more than 6 and 8		B1
	No and if you double y it is more than 6		B0
	Yes and valid reason		B0

Qu 13

16(a)	$3y(3y^2 - 2)$ or $-3y(2 - 3y^2)$	B2	B1 $3(3y^3 - 2y)$ or $y(9y^2 - 6)$ or $-3(2y - 3y^3)$ or $-y(6 - 9y^2)$
	Additional Guidance		
	$3y(3y^2 - 2)$ or $-3y(2 - 3y^2)$ followed by incorrect further work eg $3y(3y^2 - 2) = 3y^2(3y - 2)$		B1
	$3y(3y^2 - 2) = 3y(\sqrt{3}y + 2)(\sqrt{3}y - 2)$		B2
	$3y(3y^2 - 2) = 9y^3 - 6y$ (checking)		B2
	$3y \times (3y^2 - 2)$		B2
	$3 \times (3y^3 - 2y)$		B1
	$y3(3y^2 - 2)$		B1

16(b)	$(3x - 1)(x - 7)$ or $(1 - 3x)(7 - x)$	B2	B1 $(3x + a)(x + b)$ where $ab = 7$ or $a + 3b = -22$ or $(a - 3x)(b - x)$ where $ab = 7$ or $a + 3b = 22$
	Additional Guidance		
	$(3x + 1)(x + 7)$		B1
	$(3x - 1)(x - 7)$		B1
	$(3x - 4)(x - 6)$		B1
	$(7 - 3x)(1 - x)$		B1
	$(10 - 3x)(4 - x)$		B1
	$(3x - 1) \times (x - 7)$		B2
Ignore any 'solutions' seen eg $(3x - 1)(x - 7)$ in working with $\frac{1}{3}$ and 7 on answer line		B2	

Qu 14

17	Alternative method 1		
	$\sin 72 = \frac{h}{12}$ or $12 \sin 72$ or $\cos (90 - 72) = \frac{h}{12}$ or $12 \cos (90 - 72)$ or $\frac{h}{\sin 72} = \frac{12}{\sin 90}$ or 11.4...	M1	oe Any letter
	16 × their 11.4...	M1dep	
	[182.4, 182.603] or 183	A1	
	Alternative method 2		
	$h^2 + (12 \cos 72)^2 = 12^2$ or $h^2 + (12 \sin (90 - 72))^2 = 12^2$ or $\sqrt{12^2 - (12 \cos 72)^2}$ or $\sqrt{12^2 - (12 \sin (90 - 72))^2}$ or 11.4...	M1	oe Any letter
	16 × their 11.4...	M1dep	
	[182.4, 182.603] or 183	A1	
	Alternative method 3		
	0.5 × 16 × 12 × sin 72 or 91.3...	M1	oe eg 0.5 × 16 × 12 × sin 108
	2 × their 91.3...	M1dep	
	[182.4, 182.603] or 183	A1	
	Additional Guidance		
	2 × 16 × 12 × sin 72		M1M0A0
	$\sin = \frac{h}{12}$ or $\sin \theta = \frac{h}{12}$ (unless recovered)		M0

Qu 15

18(a)	$A \cap B'$	B1	
	Additional Guidance		

18(b)	$(A \cup B)'$	B1	
	Additional Guidance		

Qu 16

19	$\frac{x}{3}$	B1	
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Qu 17

20(a)	$\frac{2 \times 1^3 + 8}{3 \times 1^2 + 5}$ or 1.25	M1	
	Substitutes their answer for x or 1.2290	M1	
	(1.25 and 1.2290 and 1.2289 and answer) 1.2289	A1	Accept unrounded values for all but answer
20(b)	0.00037....	B1ft	ft their answer to (a)
	Good approximation as the result is close to 0	B1ft	ft the result of their calculation

Qu 18

20	Alternative method 1		
	$2 = k\sqrt{36}$ or $\sqrt{36} = 6$	M1	
	$(k =) 2 \div \text{their } 6$ or $\frac{1}{3}$	M1dep	
	$5 \div \text{their } \frac{1}{3}$ or $15 (\sqrt{a} =)$	M1	oe
	225	A1	
	Alternative method 2		
	$2k = \sqrt{36}$ or $\sqrt{36} = 6$	M1	
	$(k =) \text{their } 6 \div 2$ or 3	M1dep	
	$5 \times \text{their } 3$ or $15 (\sqrt{a} =)$	M1	oe
	225	A1	
	Alternative method 3		
	$2k = \sqrt{36}$ or $\sqrt{36} = 6$	M1	
	$5 \div 2$ or 2.5	M1	
	$\text{their } 6 \times \text{their } 2.5$ or $15 (\sqrt{a} =)$	M1dep	dep on M1 <u>M1</u>
	225	A1	

Qu 19

21	Angle $BCD = 2x$	M1	Opposite angles of parallelogram are equal
	Angle $FCE = 360 - 90 - 90 - 2x$ or Angle $FCE = 180 - 2x$	M1	oe Angles at a point sum to 360°
	Angle $CFE = y$ or Angle $FCE = 180 - 2y$	M1	oe eg $2y + FCE = 180$ Isosceles triangle
	$180 - 2x + y + y = 180$	M1	oe Angles in a triangle sum to 180°
	$2y = 2x$ $y = x$	A1	All reasons must be stated

Qu 20

21	Alternative method 1		
	1.2 or 0.85	M1	
	$1 \div 0.85$ or $1.1(7\dots)$ or 1.18	M1	
	1.1(7\dots) or 1.18 and 1.2 and (Option) A	A1	
	Alternative method 2		
	1.2 or 0.85	M1	
	$1 \div 1.2$ or 0.83(\dots)	M1	
	0.83(\dots) and 0.85 and (Option) A	A1	
	Alternative method 3		
	450×1.2 or 540 or $x \times 0.85$ or $0.85x$	M1	x is the usual cost of the box and may be a numerical value
	$x \div$ their 540 or their $0.85x \div 450$	M1dep	
	$0.00185(\dots)x$ and $0.00188(\dots)x$ and (Option) A	A1	oe
Alternative method 4			
450×1.2 or 540 or $x \times 0.85$ or $0.85x$	M1	x is the usual cost of the box and may be a numerical value	
their $540 \div x$ or $450 \div$ their $0.85x$	M1dep		
$\frac{540}{x}$ and $\frac{529(\dots)}{x}$ and (Option) A	A1	oe	
21	Alternative method 5		
	$\frac{1}{6}$ (free for A)	M1	oe fraction or decimal or percentage
	$\frac{3}{18}$ (free for A) and $\frac{3}{20}$ (free for B)	M1	oe pairs of fractions or pairs of decimal or pairs of percentages
	$\frac{3}{18}$ (free for A) and $\frac{3}{20}$ (free for B) and (Option) A	A1	