Version 1.0

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Methods in Mathematics 9365

Unit 2 Higher Tier 93652H

Mark Scheme

Specimen Paper

Mark Schemes

Principal Examiners have prepared these mark schemes for specimen papers. These mark schemes have not, therefore, been through the normal process of standardising that would take place for live papers.

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Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics papers, marks are awarded under various categories.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
Q	Marks awarded for quality of written communication. (QWC)
M dep	A method mark dependent on a previous method mark being awarded.
B dep	A mark that can only be awarded if a previous independent mark has been awarded.
ft	Follow through marks. Marks awarded following a mistake in an earlier step.
SC	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
oe	Or equivalent. Accept answers that are equivalent. eg, accept 0.5 as well as $\frac{1}{2}$
eeoo	Each error or omission.

M2 Higher Tier

Q	Answer	Mark	Comments
1	Any 90° rotation	B1	
	90° clockwise	B1	
	Fully correct	B1	
2	$(x =)$ 55°	B1	
	$(y =)$ 55°	B1	
	180 – 55 – their y	M1	
	$(z =)$ 70°	A1ft	
3	Venn diagram method Intersection = 16	M1	
	Mobile only section = 11 **and** Computer only section = 1	M1 dep	
	2	A1	
3 **Alt 1**	27 – 16 = 11; **and** 17 – 16 = 1	M1	
	30 – 16 – their 11 – their 1	M1 dep	
	2	A1	
3 **Alt 2**	27 + 17 – 16 (= 28)	M1	
	30 – their 28	M1 dep	
	2	A1	
4(a)	6.790566…	B1	
4(b)	7 or 6.8	B1ft	1 or 2 sf from their 4(a)
5	x = 360 – 110 – 110	M1	oe
	140	A1	
	y = 70	B1	

Q	Answer	Mark	Comments
6	$7.5^2 + 5.2^2$	M1	
	√their 83.29	M1 dep	
	9.13	A1	Accept 9.1, 9.12(…)
7(a)	Drawing diagonals of new square Showing clearly the 4 ≡ shapes	Q2	QWC Strand (iii) 2 marks for a full and clearly set out solution 1 mark for a partial or unclear solution
7(a) Alt 1	$\frac{1}{2} \times 10 \times 10$ (= 50) Their $50 \times 4 = 200$ and is $\frac{1}{2}$ of 400	Q2	QWC Strand (iii) 2 marks for a full and clearly set out solution 1 mark for a partial or unclear solution
7(a) Alt 2	Pythagoras showing side of square is √200 $\sqrt{200} \times \sqrt{200} = 200$ is $\frac{1}{2}$ of 400	Q2	QWC Strand (iii) 2 marks for a full and clearly set out solution 1 mark for a partial or unclear solution
7(b)	$\pi \times 10^2$ (= 314)	M1	
	$\frac{\text{Their } 314}{400} \times 100$	M1	
	78.5, so no	A1	
7(c)	4 quadrants (radius 10) = circle in part (b) (radius 10)	Q1	QWC Strand (i) Must use quadrants or quarter circles
8	$n = 1$; sight of $1 - 1$ (= 0)	B1	oe
	$n = 2$; sight of $2 - 2$ (= 0)	B1	oe
	4/5 or 0.8	B1	
9(a)	75	B1	
9(b)	11	B1	
9(c)	Division by the square of a prime	M1	Evidence of breaking down into product of 2 primes, one which is squared or 7×287 or 41×49
	$a = 7$	A1	Allow reverse
	$b = 41$	A1	

Q	Answer	Mark	Comments
10	$4x - 2 = 2x + 5$ or $4x - 2 = 6x - 9$ or $6x - 9 = 2x + 5$	M1	oe
	$4x - 2x = 5 + 2$ or $4x - 6x = -9 + 2$ or $6x - 2x = 5 + 9$	M1	oe
	$(x =)$ 3.5	A1	oe
	$4 \times$ their $3.5 - 2 = 12$ and $2 \times$ their $3.5 + 5 = 12$ and $6 \times$ their $3.5 - 9 = 12$	A1	Solving two of the equations and obtaining 3.5 for each solution Must show all sides = 12 QWC Strand (ii) - A structured argument using accurate mathematical language is essential to obtain full marks
11(a)	37	B1	
11(b)	$16 + a$ and $32 + 2a + a$	B1	$32 + 3a$
	$2 \times$ their $[(32 + 2a + a)] = 127$	M1	oe
	$64 + 7a = 127$	A1	oe
	$(a =)$ 9	A1	
Alt 11(b)	Evidence of multiplying 8 by 2 and adding any number	M1	
	Evidence of multiplying their answer by 2 and adding **the same** number	M1	
	Refined attempt	M1	
	$(a =)$ 9	A1	
12	Sight of tan	M1	
	$(y =) \tan^{-1}(4 \div 13)$	M1	
	17.1	A1	17 with correct working nb $4 \div \tan(13) = 17.3$ nb grads 19.0, rads 0.298 get M2

Q	Answer	Mark	Comments
13(a)	$5x(2x - 3y)$	B2	$x(10x - 15y)$; $5x(2 - 3y)$; $5x(2x - y)$ all B1
13(b)	$(x \pm a)(x \pm b)$	M1	Where $ab = \pm 54$
	$(x + 18)(x - 3)$	A1	
	-18 and 3	A1ft	
14	C = 5/4 B	M1	
	5/4 B = B + 2A	M1 dep	
	8(A)	A1	
14 Alt 1	(C = B + 2A) × by 4 4C = 4B + 8A	M1	
	5B = 4B + 8A	M1 dep	
	8(A)	A1	
14 Alt 2	(4C = 5B) 4(B + 2A) = 5B	M1	
	4B + 8A = 5B	M1 dep	
	8(A)	A1	
15	180 – 42 – 80	M1	y marked bottom left or 42 marked top right
	58	A1	
16(a)	4.2 × 5/3	M1	oe
	7	A1	
16(b)	$45 \times (4/3)^2$	M1	
	80	A1	
16(c)	$(6/2)^3$	M1	oe
	27	A1	

Q	Answer	Mark	Comments
17(a)	$-2\boldsymbol{a} + \boldsymbol{a} + 2\boldsymbol{b} + 1\frac{1}{2}\ \boldsymbol{a} - \boldsymbol{b}$	M1	oe
	$\frac{1}{2}\boldsymbol{a} + \boldsymbol{b}$	A1	
17(b)	Trapezium	M1	oe
	$\overrightarrow{SR} = \frac{1}{2}\ \overrightarrow{PQ}$, so parallel	A1	
18	$(x =)\ \frac{4 \pm \sqrt{(-4)^2 - 4 \times 1 \times -3}}{2}$	M1	Attempts to substitute one value
	$\frac{4 \pm \sqrt{28}}{2}$	M1 dep	Correct working through one substitution
	$\frac{4 \pm \sqrt{4 \times 7}}{2}$ or $\frac{4 \pm 2\sqrt{7}}{2}$	A1	Second solution substituted and worked through correctly
18 Alt	$(x - 2)^2 - 4 - 3\ (= 0)$	M1	
	$(x - 2)^2 = 7$	M1 dep	
	$x - 2 = \pm\sqrt{7}$	A1	
19	$20 \times BX = 15 \times 8$	M1	
	$BX = \frac{15 \times 8}{20}\ (= 6)$	M1 dep	
	$(AB =)\ 14$	A1	
20(a)	$\frac{1}{2} \times 25 \times 30 \times \sin 68$	M1	
	347.69…, 347.7, 348	A1	
20(b)	$BC^2 = 25^2 + 30^2 - 2\times25\times30\times\cos68$	M1	
	$BC = \sqrt{(963.1)}$	M1 dep	
	31.0...	A1	

Q	Answer	Mark	Comments
21	360 ÷ 10 **or** 360 ÷ 5	M1	or 36 or 72 or 144 or 108 angles may be marked on the diagram
	144 **and** 108	A1	or 36 **and** 72
	∠BXC = 360 – (144 + 108)	M1dep	or ∠BXC = (36 + 72) or 108 (X is the point where decagon and pentagon meet between B and C)
	∠XBC = ∠XCB = (180 – 108) ÷ 2	M1	or ∠XBC = 36
	∠ABX + ∠XBC = 144 + 36 (= 180)	A1	QWC Strand (ii) – A structured argument using accurate mathematical language is essential to obtain full marks