Version 1.1

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Applications of Mathematics 9370

Unit 2 Higher Tier 93702H

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.

A2 Higher Tier

Q	Answer	Mark	Comments
1	9 ÷ 2 (= 4.5)	M1	
	3.14 (…) × (their) 4.5^2	M1 dep	
	63.6 …	A1	64 with method SC1 254. 4(6 ...)
2	0.3 × 11 500 (or 3450)	M1	oe
	11 500 – (their) 3450	M1	M2 0.7 × 11 500
	(£) 8050	A1	
3(a)	5 × (3 – 2) **or** 5 **or** 3 × 1 **or** 3	M1	
	4 × (their) 5 + 2 × (their 3)	M1	
	26	A1	
3(b)	(Length of net =) 5 + 18 + 5 + 18 + 1	M1	
	No **and** 47 > 40	Q1	QWC Strand (ii) - Answer No with clear evidence
4(a)(i)	(£) 25	B1	
4(a)(ii)	150 (minutes)	B1	
4(b)	500 – 150 (or 350) **or** 43 – 25 (or 18)	M1	oe Allow data from any two points
	Their 18 ÷ 350 (× 100)	M1	oe or 0.05(1…) seen
	5.1 (pence)	A1	

Q	Answer	Mark	Comments
5(a)	10.15	B1	
	(forms an) isosceles triangle	B1	oe
5(b)	9.8 ÷ 2(.0)	M1	100 ÷ 2(.0) (× 9.8) or 50 (× 9.8) Allow 10 ÷ 2 and 5 × 9.8 Condone attempts to change to different units by multiplying or dividing by 10, 100, ...
	4.9	A1	or 490
	5	B1 ft	
6	14 ÷ 10 (or 1.4)	M1	70 × 10 (or 700)
	5 × 70 **or** 210 × (their) 1.4	M1	5 × (their) 700 **or** 210 × 14
	5 × 70 – 210 × (their) 1.4 (= 56)	M1	5 × (their) 700 – 210 × 14 (= 560)
	(their) 56 ÷ (their 1.4)	M1	(their) 560 ÷ (their 14)
	40	A1	QWC Strand (iii) - To achieve a correct solution a clear organised approach must be evident
Alt 6	14 ÷ 10 (or 1.4)	M1	70 × 10 (or 700)
	70 ÷ (their) 1.4 (= 50)	M1	(their) 700 ÷ 14 (= 50)
	5 × (their) 50 (= 250)	M1	
	(their) 250 – 210	M1	
	40	A1	QWC Strand (iii) - To achieve a correct solution a clear organised approach must be evident

Q	Answer	Mark	Comments
7	3.14 (…) × 2.5^2 × 9 (or 176.7 …)	M1	
	2 × 1000 ÷ (their) 176.7 …)	M1	
	11.3 (17 …)	A1	
	242 ÷ (their) 11.3 (...) (= 21.3(8 ...)	M1	Allow 242 ÷ (their) 11 (= 22)
	(their) 21.3(8 ...) × 1.3	M1	oe Allow 22 × 1.3
	28 pence	A1	Allow 29 pence if 11 used QWC Strand (ii) - A structured argument using accurate mathematical language is essential to obtain full marks
Alt 7	3.14 (…) × 2.5^2 × 9 (or 176.7 …)	M1	
	2 × 1000 ÷ (their) 176.7 …)	M1	
	11.3 (17 …)	A1	
	242 × 1.3 (= 314.6)	M1	oe
	(their) 314.6 ÷ (their) 11.3	M1	Allow 314.6 ÷ (their) 11
	28 pence	A1	Allow 29 pence if 11 used QWC Strand (ii) - A structured argument using accurate mathematical language is essential to obtain full marks
8(a)(i)	180	B1	
8(a)(ii)	18	B1	
8(b)	210 or 210 ÷ 10	M1	Allow 210 ±2°
	21	A1	
8(c)	300 – 180	M1	
	(their) 120 ÷ 10	M1	
	12	A1	

Q	Answer	Mark	Comments
9	Number of cans in length (L) Number of cans width (W) Number of cans in height (H) ($LWH = 48$) For example $L = 8$, $W = 2$, $H = 3$ $L = 4$, $W = 4$, $H = 3$ $L = 6$, $W = 4$, $H = 2$ $L = 12$, $W = 4$, $H = 1$ $L = 16$, $W = 3$, $H = 1$ $L = 12$, $W = 2$, $H = 2$	M1	**Not** $L = 48$, $W = 1$, $H = 1$
	Calculating dimensions from: (their) $L \times 74$ or 75 (their) $W \times 74$ or 75 (their) $H \times 108$ or 110	M1	Award this mark for two correct dimensions from $\times$ 74 (75) and $\times$108 (110) with L, W and H **any** factors of 48 apart from 1 and 48 (**not** 74, 108, 3552 or 5184) Allow rounded lengths eg, 75, 110
	For example 592 by 148 by 324 or 296 by 296 by 324 or 444 by 296 by 216	A1	Allow rounded lengths eg, 600 by 150 by 330 or 300 by 300 by 330 or 450 by 300 by 220 **Not** 3552 by 108 by 74 oe QWC Strand (ii) - A structured argument using accurate mathematical language is essential to obtain full marks
10	480 ÷ 5 or 96	M1	
	96 × 8 or 480 + 192 + 96	M1	
	768	A1	
11	$\sqrt{(25^2 - 7^2)}$ (= 24)	M1	
	($\sqrt{576}$) – 4 (= 20)	M1	
	$\sqrt{(25^2 -$ (their) $20^2)}$ (= 15)	M1	
	($\sqrt{225}$) – 7	M1	
	8	A1	QWC Strand (ii) - A structured argument using accurate mathematical language is essential to obtain full marks

Q	Answer	Mark	Comments
12(a)	$8 + 3 \sin(30 \times 11)$	M1	
	6.5	A1	
12(b)	Correct curve from $t = 0$ to 12 ± 2 mm from correct points	B2	B1ft 10 or 11 points plotted correctly $\pm$ 2 mm ft (11, (their) 6.5)
12(c)	Draws line $d = 10$ or identifies points where $d = 10$	M1	
	($t =$) 1.5 and 4.5	M1	Allow 1.4 to 1.6 and 4.4 to 4.6
	(Between) 01:30 **and** 04:30	A1	Allow ± 6 minutes with method
13	Use of $70 \div 2$ ($= 35°$) **or** $90 - 70 \div 2$ ($= 55°$) **and** $50 \div 2$ ($= 25°$)	B1	
	(their) $25 \div$ width = tan (their) 35	M1	Width $\div$ (their) 25 = tan (their) 55 oe
	(width =) $25 \div \tan 35$	M1	(width =) $25 \times \tan 55$
	35.7 …	A1	Allow 36 with method
Alt 13	Use of $70 \div 2$ ($= 35°$) **or** $90 - 70 \div 2$ ($= 55°$) **and** $50 \div 2$ ($= 25°$)	B1	
	(their) $25 \div \sin 35$ ($= 43.586...$) or (their) $25 \div \cos 55$ ($= 43.586...$)	M1	Width $\div \sin 55 = 25 \div \sin 35$
	$\sqrt{((\text{their}) 43.586^2 - 25^2)}$	M1	$25 \times \sin 55 \div \sin 35$
	35.7 …	A1	

Q	Answer	Mark	Comments
14(a)	$\frac{30}{20} \times 12$ **or** $12 \div \frac{20}{30}$	M1	$30 \div \frac{20}{12}$ **or** $30 \times \frac{12}{20}$ $12 \div \frac{10}{15}$ **or** $12 \times \frac{15}{10}$ oe
	18	A1	
14(b)	$1080 \div (\frac{20}{10})^2$ or $1080 \times (\frac{10}{20})^2$ **or** $1080 \div (\frac{10}{5})^2$ or $1080 \times (\frac{5}{10})^2$	M1	or 1080 ÷ 4 or 1080 × 0.25
	270	A1	
15	Attempt to find radii or diameters eg, 2 ÷ 4 or 1 ÷ 4	M1	
	Diameters = $6\frac{1}{2}$, 7, $7\frac{1}{2}$	A1	
	$\pi \times 4^2$ **or** $\pi \times 3\frac{3}{4}^2$ **or** $\pi \times 3\frac{1}{2}^2$ **or** $\pi \times 3\frac{1}{4}^2$	M1	
	$\pi \times 4^2 + \pi \times 3\frac{3}{4}^2 + \pi \times 3\frac{1}{2}^2 + \pi \times 3\frac{1}{4}^2$	M1	
	(their) 50.26 + (their) 44.18 + (their) 38.48 + (their) 33.18 **or** 165 to 167	M1	Allow one error
	Yes **and** 165 or 166… > 150	A1	Must make correct conclusion QWC Strand (ii) - A structured argument using accurate mathematical language is essential to obtain full marks

Q	Answer	Mark	Comments
16(a)(i)	Using ordinates 2.7, 4.3, 5.1, 5.2 and 5.1 ± 0.1 allow one error	M1	**Alternative methods** Dividing area into at least 3 rectangles, triangles and/or trapezia
	0.5 × 2 × (their) 2.7 (or 2.7) **and** 0.5 × 2 × (their) (2.7 + 4.3) (or 7.0) **and** 0.5 × 2 × (their) (4.3 + 5.1) (or 9.4) **and** 0.5 × 2 × (their) (5.1 + 5.2) (or 10.3) **and** 0.5 × 2 × (their) (5.2 + 5.1) (or 10.3)	M1	Finding areas of each of their shapes. Correct methods must be seen or indicated by correct answers to their smaller areas
	(their) 2.7 + 7.0 + 9.4 + 10.3 + 10.3	M1	Attempt to sum their areas of all their shapes
	39.7 ± 0.9	A1	
16(a)(ii)	(Total) distance run (in first 10 seconds)	B1	
16(b)(i)	Attempts to draw tangent at $t = 5$	B1	
	Attempt to find gradient of (their) tangent	B1	
	0.3 to 0.4	B1	
16(b)(ii)	Acceleration or rate of change of speed (at 5 seconds)	B1	