

International GCSE in Mathematics A - Paper 1H mark scheme

Question	Working	Answer	Mark	AO	Notes
1	$7800 \div 9.75$ or $7800 \div 585 \times 60$	800	3	AO2	M2 A1 M1 for $7800 \div 9.45$ or $7800 \div 585$ or $13.3\dots$.
2	$28 \div (6 - 4)$ (=14) '14' $\times 3$ (=42)			AO1	M1 or use of cancelled ratios (e.g. $3 : 6 : 4 = 0.75 : 1.5 : 1$) M1 (dep) $28 \div 0.5$ (=56) or cancelled ratios, (e.g. 56×0.75) or M2 for $28 \div \frac{2}{3}$ oe $\frac{2}{3}$
3	a b $(12 \times 2.5) + (6 \times 7.5) + (4 \times 12.5) + (6 \times 17.5) + (14 \times 22.5) + (18 \times 27.5)$ or $30 + 45 + 50 + 105 + 315 + 495$ or 1040 '1040' $\div 60$	$25 < d \leq 30$	1	AO3 AO3	B1 B1 identifies $25 \rightarrow 30$ class M2 M1 for frequency $\times$ consistent value within interval NB. Products do not need to be added Condone one error M1 A1 accept 17.3(33....)
c		$17\frac{1}{3}$	4	AO3	M1 A1 for $\frac{a}{60}$ with $a < 60$ or $\frac{32}{b}$ with $b > 32$
		$32\frac{\text{oe}}{60}$	2		A1

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4	<p>Working with all 12 boxes</p> $12 \times 15 (=180) \text{ or } 12 \times 12 (=144)$ $12 \times 12 \times \frac{3}{4} \times 1.6 \text{ oe } (=172.8)$ $12 \times 15 \times 1.15 \text{ oe } (=207) \text{ or }$ $180 \times 0.15 \text{ oe } (=27)$ $\frac{'207' - '172.8'}{36} \text{ or } \frac{34.2}{36} \text{ or }$ $\frac{'27' + ('180' - '172.8')}{36}$	0.95	5	AO1	<p>M1 for correct total cost or correct total number of melons (either may appear as part of another calculation)</p> <p>M1 for revenue from all full price melons sold</p> <p>M1 for total revenue or total profit</p> <p>M1 dep on M3</p> <p>A1 cao</p>
	<p>Alternative – working with one box</p> $15 \div 12 (=1.25) \text{ or } 12 \times \frac{3}{4} (=9)$ $12 \times \frac{3}{4} \times 1.6 \text{ oe } (=14.4)$ $15 \times 1.15 (=17.25)$ $\frac{'17.25' - '14.4'}{3} \text{ or } \frac{2.85}{3}$	0.95	5		<p>M1 for price of 1 melon or number of full price melons</p> <p>M1 for revenue from all full price melons sold</p> <p>M1 for total revenue from one box</p> <p>M1 dep on M3</p> <p>A1 cao</p>

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5	Circular arc, centre B , to intersect both lines AB and BC Equal length arcs, from intersections on each line, meeting to give a point on the bisector	correct bisector	2	AO2	M1 A1 dep on M1 Full construction shown.
6					
a				AO1	M1 Any correct partially factorised expression
b	$(x \pm 6)(x \pm 2)$ $(x - 6)(x + 2)$	$9e^2f(2e + 5f^3)$	2	AO1	A1 M1 or correct substitution into quadratic formula (condone one sign error) M1 $\frac{4 \pm \sqrt{64}}{2}$ A1 dep. on at least M1
7		$6, -2$	3	AO2	M1 M1 A1 14.4 ~ 14.42
	$\cos 35 = \frac{PR}{17.6}$ $17.6 \times \cos 35$	14.4	3		
8	$22.50 \div 15 (=1.5)$ or $100 \div 15$ (=6.6....) "1.5" $\times 100 (=150)$ or "6.6..." $\times 22.5(0)$	150	3	AO1	M1 M1 dep A1 } M2 for $22.5 \div 0.15$

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9	a	140 000	1	AO1	B1
	b	Mars	1	AO1	B1
	c	$1.2 \times 10^5 - 5 \times 10^4$ or 120000 – 50000 or 70000 or		AO1	M1
	d	$3.5 \times 10^3 : 1.4 \times 10^6$	2	AO1	A1 M1 A1
10		$1 : 400$	2		M1
				AO2	
	$\sqrt{9.5^2 - 7.6^2}$ or $\sqrt{90.25 - 57.76}$ or $\sqrt{32.49}$ or $\sqrt{32.5}$ (BC =) 5.7 $\frac{1}{2} \times 7.6 \times 5.7$ or 21.6(6) or 21.7				A1 M1 dep on first M1 or e.g. $ACB = \sin^{-1}\left(\frac{7.6}{9.5}\right)$ (= 53.1...) and $\frac{1}{2} \times 9.5 \times 5.7 \times \sin 53.1^\circ$
	$\frac{1}{2} \times \pi \times \left(\frac{5.7}{2}\right)^2$ or 12.7(587...) or 12.8	34.4	5		M1 dep on first M1 A1 for answer rounding to 34.4 ($\pi \rightarrow 34.4187... \quad 3.14 \rightarrow 34.4123...$)

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11	e.g. $(x^2 + 5x - 3x - 15)(x + 3)$ or $(x^2 + 2x - 15)(x + 3)$ or $(x - 5)(x^2 + 3x - 3x - 9)$ or $(x - 5)(x^2 - 9)$ E.g. $x^3 + 3x^2 + 2x^2 + 6x - 15x - 45$ or $x^3 + 5x^2 - 9x - 45$			AO1	M1 expansion of any two of the three brackets – at least 3 correct terms M1 (dep) fit for at least 3 correct terms in second expansion A1
12		$x^3 + 5x^2 - 9x - 45$	3		
a	14 16 17 18 20 21 22 23 23 24 24 (14 16 17 18 20 <u>21</u> 22 23 23 24 24) (14 16 <u>17</u> 18 20) and (22 23 <u>23</u> 24 24) 23 - 17			AO3	M1 arrange in order or One of 21(median), 17(LQ), 23(UQ) identified M1 Identify any two of 21, 17 and 23
b		6 Carmelo and reason using IQR	3 1	AO3	A1 cao B1 fit from (a) Carmelo - he has a lower IQR oe (IQR must be part of the statement)

Question	Working	Answer	Mark	AO	Notes
13 a	$m = \frac{5-2}{-3-1}$ or $-\frac{3}{4}$ oe			AO1	M1 for gradient
	eg. $2 = -\frac{3}{4} \times 1 + c$ or				M1 for method to find c
	$y - 2 = -\frac{3}{4}(x - 1)$				
	$y = -\frac{3}{4}x + \frac{11}{4}$				M1 found values of m and c substituted in $y = mx + c$
b	$y = \frac{1-2x}{6}$ or $m = -\frac{1}{3}$ oe	$3x + 4y = 11$	4	AO1	A1
		shown	2		M1 for conclusion from correct gradients
14	$26 \div 20 (=1.3)$ or			AO3	M1 Any one frequency density (without contradiction) or, e.g. $1\text{cm}^2 = 5$ or clear association of area with frequency
	3.6×10 or 3.3×10 or 1×30 or				
	36 or 33 or 30 or $\frac{26}{130} \left(= \frac{1}{5} \right)$				
	$26 + 3.6 \times 10 + 3.3 \times 10 + 1 \times 30$ or				
	$26 + 36 + 33 + 30$ or $625 \times \frac{1}{5}$ or				M1 Any fully correct complete method; condone one error in bar width or bar height
	$(130 + 180 + 165 + 150) \times \frac{1}{5}$	125	3		A1

Question	Working	Answer	Mark	AO	Notes
15	a			AO1, AO2	M1 or $(2x \times 3x) + 2(2x + 1) + 3x = 100$ oe or $(2x \times 3x) + (2 \times 2x (\times 1)) + 1 + 3x + 1 + 1 = 100$ oe other partitions are acceptable but partitioning must go on to form a correct equation.
		$6x^2 + 7x - 98 = 0$ *	2		A1 Accept $6x^2 + 7x + 2 = 100$ if M1 awarded * Answer given
	b			AO1	M2 or $(x =) \frac{-7 \pm \sqrt{49 + 2352}}{12}$ or $(x =) \frac{-7 \pm \sqrt{2401}}{12}$ If not M2 then M1 for $(3x \pm 14)(2x \pm 7)$ or $(x =) \frac{-7 \pm \sqrt{7^2 - 4 \times 6 \times -98}}{2 \times 6}$ A1 Dependent on at least M1 Ignore negative root M1 ft Dependent on at least M1 and $x > 0$
	$x = 3.5$ (Area =) $6 \times '3.5'^2$ or $(3 \times '3.5') \times (2 \times '3.5')$	73.5	5		A1

Question	Working	Answer	Mark	AO	Notes
16	$180 - 77 - 39$ or $\angle BAD = 77^\circ$ and $\angle ABD = 39^\circ$ or $\angle BAX = 64^\circ$ where X is on PA produced or a fully correct method to find angle ADB	64	5	AO2	M2 also accept 103 – 39 M1 for $\angle BAD = 77^\circ$ or $\angle ABD = 39^\circ$ (angles may be stated or marked on diagram) B1 Opposite angles in a cyclic quadrilateral add up to 180° B1 Alternate segment theorem A1 cao
17	41.5 or 42.5 or 24.5 or 23.5 or 14.5 or 13.5 $(y =) \frac{2 \times 41.5}{24.5 - 13.5}$	7.5	3	AO1	B1 M1 A1 A1 accept $\frac{83}{11}$ or 7.55 or $7.\dot{5}\dot{4}$ (depending on M1) NB. Answer must come from correct working

Question	Working	Answer	Mark	AO	Notes
18	$(x-1) \times \frac{(3x+2)}{(x^2-1)}$ $(x+1)(x-1)$ $\text{eg } \frac{3(x+1)-(3x+2)}{(x+1)}$	$\frac{1}{x+1}$	4	AO1	M1 correct method for division M1 correct factorisation of $x^2 - 1$ M1 correct single fraction A1
19	$130 = \pi \times 4.5 \times l$ $l = \frac{130}{4.5\pi} \text{ or } l = 9.1956$ $\sin(AVO) = 4.5/9.20'' (= 0.489..)$	58.6	4	AO2	M1 M1 For exact expression or answer which rounds to 9.2 M1 For a correct expression for $\sin AVO$ or $\cos AVB$ $\cos(AVB) = (9.2^2 + 9^2 - 9^2)/(2 \times 9.2 \times 9.2)$ $(= 0.521...)$ A1 awrt 58.6
20	ai aii aiii b	(0, 5) (3, 10) (1, 5) translation $\begin{pmatrix} 0 \\ -4 \end{pmatrix}$	1 1 1 1	AO1	B1 B1 B1 B1

Question	Working	Answer	Mark	AO	Notes
21	$\left(\frac{dy}{dx}\right) = 2 \times 8x - 2x^{-2}$ $2 \times 8x - 2x^{-2} = 0$ $x^3 = \frac{1}{8}$ or $x = 0.5$ oe	(0.5, 6)	5	AO1	M2 (M1 for one term differentiated correctly)
					M1 dep on M1
					M1
					A1
22	$\overrightarrow{AE} = \overrightarrow{AD} + \overrightarrow{DE}$ oe eg. $\overrightarrow{DE} = \frac{1}{3}\overrightarrow{DB}$ or $\overrightarrow{BE} = \frac{2}{3}\overrightarrow{BD}$ $\overrightarrow{AE} = 2\mathbf{b} + 4\mathbf{a}$ $\overrightarrow{BC} = \overrightarrow{BA} + \overrightarrow{AD} + \overrightarrow{DC} (=3\mathbf{b} + 6\mathbf{a})$	eg. $\overrightarrow{AE} = 2(\mathbf{b} + 2\mathbf{a})$ and $\overrightarrow{BC} = 3(\mathbf{b} + 2\mathbf{a})$	5	AO2	M1 may be fully or partially in terms of a and/or b M1 correct use of ratio
					A1
					M1 may be fully or partially in terms of a and/or b
					A1 NB Correct expressions for $\overrightarrow{BC}$ and $\overrightarrow{AE}$ must be given

Question	Working	Answer	Mark	AO	Notes
23	$a + 3d = 17$ or $a + 9d = 35$ or $35 - 17 = 6d$ $d = 3$ $a = 8$ $\frac{50}{2}(2 \times '8' + (50 - 1) \times '3')$ oe	4075	5	AO1	M1 for $17 = 4p + q$ and $35 = 10p + q$ $p = 3$ and $q = 5$ $u_1 = 8$ and $u_{50} = 155$ $\frac{1}{2} \times 50(8 + 155)$