

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)	42	3	AO1	M1 M1 (dep) A1 or use of cancelled ratios (e.g. $3 : 6 : 4 = 0.75 : 1.5 : 1$) $28 \div 0.5$ (=56) or cancelled ratios, (e.g. 56×0.75) or M2 for $28 \div \frac{2}{3}$ oe
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 M2 M1 A1 M1 A1 M1 A1 NB. Products do not need to be added Condone one error accept 17.3(33...)
c		$17\frac{1}{3}$	4	AO3	for $\frac{a}{60}$ with $a < 60$ or $\frac{32}{b}$ with $b > 32$
		$\frac{32}{60}$ oe	2	A1	A1

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4	<p><u>Working with all 12 boxes</u></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><u>Alternative – working with one box</u></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		$9e^2f(2e + 5f^3)$	2	AO1	M1 A1 Any correct partially factorised expression
b	$(x \pm 6)(x \pm 2)$ $(x - 6)(x + 2)$			AO1	M1 or correct substitution into quadratic formula (condone one sign error)
		$6, -2$	3		M1 or $\frac{4 \pm \sqrt{64}}{2}$ A1 dep. on at least M1
7	$\cos 35 = \frac{PR}{17.6}$ $17.6 \times \cos 35$			AO2	M1
		14.4	3		M1 A1 $14.4 \sim 14.42$
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 A1 M2 for $22.5 \div 0.15$ dep

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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 7×10^4	2	AO1	M1
	d	$3.5 \times 10^3 : 1.4 \times 10^6$ $1 : 400$	2	AO1	A1 M1 A1
10	$\sqrt{9.5^2 - 7.6^2}$ 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 $\frac{1}{2} \times \pi \times \left(\frac{5.7}{2}\right)^2$ or 12.7(587...) or 12.8	34.4	5	AO2	M1 A1 M1 dep on first M1 or e.g. $ACB = \sin^{-1}\left(\frac{7.6}{9.5}\right)$ (= 53.1...) and $\frac{1}{2} \times 9.5 \times 5.7 \times \sin 53.1^\circ$ M1 dep on first M1

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

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15 a	$(3x + 2)(2x + 1) = 100$			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	$(3x + 14)(2x - 7) (= 0)$			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 $(x =) \frac{-7 \pm \sqrt{7^2 - 4 \times 6 \times -98}}{2 \times 6}$
	$x = 3.5$ (Area =)				A1 Dependent on at least M1 Ignore negative root
	$6 \times '3.5'^2$ or $(3 \times '3.5') \times (2 \times '3.5')$	73.5	5		M1 ft Dependent on at least M1 and $x > 0$ A1

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16	$180 - 77 - 39$ or $\angle BAD = 77^\circ$ and $\angle ABD = 39^\circ$ or $\angle BA'X'' = 64^\circ$ 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 $\angle ABD = 39^\circ$ (angels may be stated or marked on diagram) B1 Opposite angles in a cyclic quadrilateral add up to 180° B1 Alternate segment theorem oe 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

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18	$(x-1) \times \frac{(3x+2)}{(x^2-1)}$ $(x+1)(x-1)$ 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	$130 = \pi \times 4.5 \times l$ $l = \frac{130}{4.5\pi} \text{ or } l = 9.1956$ $\sin(AVB) = 4.5 / 9.20 \text{ (} = 0.489 \text{.)}$	58.6	4	AO2	M1 For exact expression or answer which rounds to 9.2 M1 For a correct expression for $\sin AVB$ $\cos(AVB) = (9.2^2 - 9^2) / (2 \times 9.2 \times 9.2)$ $(= 0.521 \dots)$ 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 AO1	B1 B1 B1 B1

Question	Working	Answer	Mark	AO	Notes
21	$\left(\frac{dy}{dx}\right) = 2 \times 8x - 2x^{-2}$ $2 \times 8x - 2x^{-2} = 0$ $x^3 = \frac{1}{8} \text{ or } x = 0.5 \text{ oe}$	(0.5, 6)	5	AO1	M2 (M1 for one term differentiated correctly) M1 dep on M1 M1 A1
22	$\overrightarrow{AE} = \overrightarrow{AD} + \overrightarrow{DE} \text{ oe}$ $\text{eg. } \overrightarrow{DE} = \frac{1}{3}\overrightarrow{DB} \text{ or } \overrightarrow{BE} = \frac{2}{3}\overrightarrow{BD}$ $\overrightarrow{AE} = 2\mathbf{b} + 4\mathbf{a}$ $\overrightarrow{BC} = \overrightarrow{BA} + \overrightarrow{AD} + \overrightarrow{DC} (=3\mathbf{b} + 6\mathbf{a})$	$\text{eg. } \overrightarrow{AE} = 2(\mathbf{b} + 2\mathbf{a})$ $\text{and } \overrightarrow{BC} = 3(\mathbf{b} + 2\mathbf{a})$	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

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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 $u_{50} = 155$ $\frac{1}{2} \times 50(8 + 155)$

