

International GCSE in Mathematics A - Paper 1H sample assessment 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) 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' $\div 60$ c	$25 < d \leq 30$ $17\frac{1}{3}$ $32\frac{32}{60}$ oe	1 4 2	AO3 AO3 AO3	B1 M2 M1 A1 M1 A1 B1 identifies 25 $\rightarrow$ 30 class M1 for frequency $\times$ consistent value within interval NB. Products do not need to be added Condone one error accept 17.3(33...) for $\frac{a}{60}$ with $a < 60$ or $\frac{32}{b}$ with $b > 32$

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

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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
10		1 : 400	2		M1
				AO2	M1
	$\sqrt{9.5^2 - 7.6^2}$ or $\sqrt{90.25 - 57.76}$ or $\sqrt{32.49}$ or $\sqrt{32.5}$ (BC =) 5.7			A1	A1
	$\frac{1}{2} \times 7.6 \times 5.7$ or 21.6(6) or 21.7			M1	dep on first M1
	$\frac{1}{2} \times \pi \times \left(\frac{5.7}{2}\right)^2$ or 12.7(587...) or 12.8				or e.g. $ACB = \sin^{-1}\left(\frac{7.6}{9.5}\right) (= 53.1\dots)$ and $\frac{1}{2} \times 9.5 \times 5.7 \times \sin 53.1^\circ$
				M1	dep on first M1
		34.4	5		A1
					for answer rounding to 34.4 ($\pi \rightarrow 34.4187\dots$ 3.14 $\rightarrow$ 34.4123...)

Question	Working	Answer	Mark	AO	Notes
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 M1
		shown	2		A1 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 $(x =) \frac{-7 \pm \sqrt{7^2 - 4 \times 6 \times -98}}{2 \times 6}$
	$x = 3.5$ (Area =) $6 \times '3.5'^2$ or $(3 \times '3.5') \times (2 \times '3.5')$	73.5	5		A1 Dependent on at least M1 Ignore negative root M1 ft Dependent on at least M1 and $x > 0$ A1

Question	Working	Answer	Mark	AO	Notes
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 $\angle ABD = 39^\circ$ (angles 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	$(x-1) \times \frac{(3x+2)}{(x^2-1)}$ $(x+1)(x-1)$ $\text{eg } \frac{3(x+1)-(3x+2)}{(x+1)}$	$\frac{1}{x+1}$	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 $\cos AVB$ $\cos(AVB) = (9.2)^2 + (9.2)^2 - 9^2 / (2 \times 9.2 \times 9.2)$ $(= 0.521...)$ 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 $u_{50} = 155$ $\frac{1}{2} \times 50(8 + 155)$