

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....
2	$28 \div (6 - 4) (=14)$  $'14' \times 3 (=42)$	42	3	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. $56 \times 0.75$ )  or M2 for $28 \div \frac{2}{3}$ oe  A1
3	a b  c	$25 < d \leq 30$        $17\frac{1}{3}$      $\frac{32}{60}$ oe	1        4      2	AO3 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...)  M1 for $\frac{a}{60}$ with $a < 60$ or $\frac{32}{b}$ with $b > 32$  A1

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4	<p><b><u>Working with all 12 boxes</u></b></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 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
	<p><b><u>Alternative – working with one box</u></b></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	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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9	a	140 000	1	AO1	B1	
	b	Mars	1	AO1	B1	
	c	$1.2 \times 10^5 - 5 \times 10^4$ <b>or</b> 120000 – 50000 <b>or</b> 70000 <b>oe</b>			AO1	M1
	d	$3.5 \times 10^3 : 1.4 \times 10^6$	$7 \times 10^4$	2		A1
		1 : 400	2	AO1	M1 A1	
10	$\sqrt{9.5^2 - 7.6^2}$ <b>or</b> $\sqrt{90.25 - 57.76}$ <b>or</b> $\sqrt{32.49}$ <b>or</b> $\sqrt{32.5}$ (BC = ) 5.7 $\frac{1}{2} \times 7.6 \times 5.7$ <b>or</b> 21.6(6) <b>or</b> 21.7  $\frac{1}{2} \times \pi \times \left(\frac{5.7}{2}\right)^2$ <b>or</b> 12.7(587...) <b>or</b> 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...) <b>and</b>  $\frac{1}{2} \times 9.5 \times 5.7 \times \sin 53.1$  M1 dep on first M1  A1 for answer rounding to 34.4 ( $\pi \rightarrow 34.4187...$ 3.14 $\rightarrow 34.4123...$ )	

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

Question	Working	Answer	Mark	AO	Notes
13	a			AO1	M1 for gradient M1 for method to find $c$
	b			AO1	M1 found values of $m$ and $c$ substituted in $y = mx + c$ A1 M1 A1 for conclusion from correct gradients
14	$26 \div 20 (=1.3)$ or $3.6 \times 10$ or $3.3 \times 10$ or $1 \times 30$ 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 $(130 + 180 + 165 + 150) \times \frac{1}{5}$	$3x + 4y = 11$  shown	4  2	AO3	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  A1

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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.
	b		2	AO1	A1 Accept $6x^2 + 7x + 2 = 100$ if M1 awarded * Answer given 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 $180^\circ$ 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 <b>must</b> come from correct working



Question	Working	Answer	Mark	AO	Notes
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	$130 = \pi \times 4.5 \times l$ $l = \frac{130}{4.5\pi} \text{ or } l = 9.1956$ $\sin(AVO) = 4.5^{\circ} 9.20^{\circ} (= 0.489..)$	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   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 $\mathbf{a}$ and/or $\mathbf{b}$ M1 correct use of ratio  A1 M1 may be fully or partially in terms of $\mathbf{a}$ and/or $\mathbf{b}$ A1 <b>NB</b> 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  A1 A1 ft from $d = 3$ M1  A1	M1 for $17 = 4p + q$ and $35 = 10p + q$  $p = 3$ and $q = 5$ $u_1 = 8$ and $u_{50} = 155$ $\frac{1}{2} \times 50(8 + 155)$