

Paper 1MA1: 2H			
Question	Working	Answer	Notes
1		$t = \frac{w-11}{3}$	M1 For isolating term in $t$ , eg. $3t = w - 11$ or dividing all terms by 3, eg. $\frac{w}{3} = \frac{3t}{3} + \frac{11}{3}$ A1 for $t = \frac{w-11}{3}$ oe
2		Jardins of Paris	P1 correct process to convert one price to another currency, eg $1980 \div 1.34$ P1 for a complete process leading to 3 prices in the same currency C1 for 3 correct and consistent results and a correct comparison made.
3		Mean of 96 or net deviation of 0 so target met	M1 for correct interpretation of the graph, with at least one correct reading or a line drawn through 96 with at least one correct deviation M1 complete method to find mean of six months sales, eg. $(110+84+78+94+90+120) \div 6 (= 96)$ or the mean of six deviations, eg. $(14-12-16-2-6+24) \div 6 (= 0)$ C1 for a correct answer of 96 or 0 with correct conclusion

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4	a b	$160 < h \leq 170$ 1. Points should be plotted at mid-interval values 2. The polygon should not be closed	B1 for identifying the correct class interval C1 for a correct error identified C1 for a correct error identified
5	a b	graph  4.5	M1 for method to start to find distance cycled in 36 mins, eg. line drawn of correct gradient or $15 \times \frac{36}{60}$ C1 for correct graph from 9.00 am to 9.36 am C1 for graph drawn from "(9.36, 9)" to (10.45, "9" + 8) M1 for $18 \times 0.25$ oe A1 cao
6		8112	M1 for complete method, eg. $7500 \times 1.04^2$ A1 cao

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7		No with supporting evidence	<p>P1 for the start of a correct process, eg. two of <math>x</math>, <math>2x</math> and <math>2x+7</math> or a fully correct trial, eg. <math>5 + 10 + 17 = 32</math></p> <p>P1 for setting up an equation in <math>x</math>. eg. <math>x + 2x + 2x + 7 = 57</math> or a correct trial totalling 57, eg. <math>10 + 20 + 27 = 57</math></p> <p>C1 (dep on P2) for at least one correct result and for a correct deduction from their answers found, eg. Chris has 20 so it is impossible for all to have 20 since 60 marbles would be needed.</p>
8		66.9	<p>P1 for process to find the area of one shape, eg. <math>19 \times 16 (= 304)</math> or <math>\pi \times 8^2 (= 201.06\dots)</math></p> <p>P1 for process to find the shaded area, eg. "304" – "201.06" <math>\div 2 (= 203.46\dots)</math></p> <p>P1 for a complete process to find required percentage, eg. <math>\frac{203.46}{304} \times 100</math></p> <p>A1 for answer in range 66 to 68</p>
9		135	<p>B1 for identifying the angle of <math>70^\circ</math> (on the diagram), showing understanding of notation</p> <p>P1 for process to find an angle in triangle <math>ABC</math>, eg. for process to find angle <math>BAC</math>, eg. <math>(180 - 50) \div 2 (= 65^\circ)</math></p> <p>A1 for 135</p>

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10 a		-1.5	M1 for method to find gradient, eg. $210 \div 140$ A1 for correct interpretation of the negative gradient
b			C1 for explanation, eg. rate of change of depth of water in tank
11 a		0.49	M1 for $0.7 \times 0.7$ A1 for 0.49 oe
b		0.51	M1 for a correct process, eg. $1 - "0.49"$ or $0.7 \times 0.3 + 0.3 \times 0.7 + 0.3 \times 0.3$ A1 for 0.51 oe
12 a		0.4	B1 For 0.4 oe
b		0.586	B1 for 3.48207..... or 17.34 or 0.200811... B1 for 0.585 to 0.586
13		Fully correct algebra to show given result	M1 for method to find the product of any two linear expressions; eg. 3 correct terms or 4 terms ignoring signs M1 for method of 6 products, 4 of which are correct (ft their first product) A1 for fully accurate working to give the required result

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14		33.8	<p>P1 for recognition of similar triangles or equal ratio of sides</p> <p>P1 for process to find <math>CB</math>, eg. <math>\frac{5}{13} = \frac{13}{CB}</math></p> <p>A1 for 33.8</p>
15		18.3	<p>P1 for a start to the process interpreting the information correctly, eg. <math>T = k\sqrt{L}</math> oe</p> <p>P1 for next stage in process to find percentage change in <math>T</math>, eg. <math>\sqrt{1.4}</math></p> <p>A1 for 18.3 to 18.4</p>
16		84	<p>M1 for correct interpretation of given information leading to a method to find fd, eg. <math>20 \div 100</math> (thousand)</p> <p>P1 for start of process to find required frequency, eg. <math>0.8 \times 50 (=40)</math> or <math>0.6 \times 50 (=30)</math> or <math>0.14 \times 100 (=14)</math></p> <p>A1 for 84 cao</p>
17		$n^2 - n + 1$ oe	<p>M1 for correct deduction from differences, eg. 2nd difference of 2 implies <math>1n^2</math> or sight of <math>1^2, 2^2, 3^2, \dots</math></p> <p>M1 for sight of <math>1^2, 2^2, 3^2, \dots</math> linked with 1, 2, 3, ...</p> <p>A1 for <math>n^2 - n + 1</math> oe</p>

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18		$3x^2 + 10x$	<p>M1 start a chain of reasoning, eg. <math>3(x+2)^2 - 2(x+2) - 8</math></p> <p>M1 continue chain by expanding brackets correctly, eg. <math>3x^2 + 12x + 12 - 2x - 4 - 8</math></p> <p>A1 for <math>3x^2 + 10x</math> (<math>a = 3, b = 10</math>)</p>
19		8.63 to 8.65	<p>P1 for a start of process, eg. <math>0.5x(x - 2) = 2.5</math></p> <p>P1 for rearranging to give a quadratic equation, eg. <math>x^2 - 2x - 5 = 0</math> oe.</p> <p>P1 for a process to solve the quadratic equation, condoning one sign error in use of formula (<math>x = 3.449... \text{ and } x = -1.449...</math>)</p> <p>P1 for selecting the positive value of <math>x</math> and applying Pythagoras to find the hypotenuse, eg. <math>\sqrt{3.449^2 + 1.449^2}</math> (<math>= 3.74...</math>)</p> <p>P1 for complete process to find perimeter</p> <p>A1 for answer in the range 8.63 to 8.65</p>

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20 a		3 to 4	C1 B1 C1 M1 A1 for a tangent drawn at $t = 6$ for answer in range 3 to 4
b		452	for splitting the area into 3 strips and a method of finding the area of one shape under the graph, eg. $\frac{1}{2} \times 4 \times 35 (= 70)$ for complete process to find the area under the graph, eg "70" + $\frac{1}{2} \times 4 \times (35 + 51) (= 172)$ + $\frac{1}{2} \times 4 \times (51 + 54) (= 210)$ [= 452] for 452
21		10169 or 10170	P1 P1 C1 for correct use of formula to find number in 2016, eg. $1.05(9500 - 250) (= 9712.5)$ for complete iterative process, eg. 2017: $1.05(9712.5 - 250) (= 9935.625)$ 2018: $1.05(9935.625 - 250)$ for answer of 10169.90... correctly rounded or truncated to nearest whole number
22		1.5	B1 M1 A1 for any correct bound clearly identified, eg. $99.65 \rightarrow x \rightarrow 99.75$ or $66.5 \rightarrow y \rightarrow 67.5$ for method to find UB, eg. "99.75" $\div$ "66.5" for 1.5

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23		$y = -\frac{4}{3}x + \frac{25}{3}$ oe	<p>M1 for method to find gradient of tangent,            eg. <math>-1 \div \frac{3}{4} = -\frac{4}{3}</math></p> <p>M1 for method to find y-intercept using <math>y = -\frac{4}{3}x + c</math></p> <p>A1 <math>y = -\frac{4}{3}x + \frac{25}{3}</math> oe</p>
24		Proof	<p>C1 for joining <math>AO</math> (extended to <math>D</math>) and considering angles in two triangles (algebraic notation may be used here)</p> <p>C1 for using isosceles triangle properties to find angle <math>BOD</math> (eg. <math>x + x = 2x</math>) or angle <math>COD</math> (eg. <math>y + y = 2y</math>)</p> <p>C1 for angle <math>BOC = 2x + 2y</math>  <math>[= 2 \times \text{angle } BAO + 2 \times \text{angle } CAO]</math></p> <p>C1 for completion of proof with all reasons given,            eg. base <u>angles</u> of <u>isosceles</u> triangle are <u>equal</u>            and sum of <u>angles</u> at a <u>point</u> is <u><math>360^\circ</math></u></p>