

Paper 1MA1: 2H		Working	Answer	Notes
1			96	<p>P1 a strategy to start to solve the problem eg $18 \div (7 - 4)$ (=6)</p> <p>P1 for completing the process of solution eg “6” $\times (4 + 5 + 7)$</p> <p>A1 cao</p>
2			20.9	<p>M1 correct recall of appropriate formula eg $\sin x = \frac{5}{14}$</p> <p>A1 for 20.9(248...)</p>
3	(a)		$4n+2$	<p>M start to deduce nth term from information given eg $4n+k$ where $k \neq 2$</p> <p>A1 cao</p>
	(b)		No (supported)	<p>M1 starts method that could lead to a deduction eg uses inverse operations</p> <p>C1 for a convincing argument eg 34 is 107 so NO; $(108-5) \div 3$ is not an integer</p>
4			<p>conclusion</p> <p>(supported)</p>	<p>P1 $30 \div 70$ (=0.428) $26 \div 60$ (=0.4333...)</p> <p>P1 $60 \times$ “0.428...” $70 \times$ “0.4333...”</p> <p>C1 for conclusion linked to 25.7 mins, 30.3 miles or 69.2 mph</p> <p>$30 \div 26$ (=1.153...)</p> <p>$60 \times$ “1.153...”</p>

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5	(a)		$22 \leq f < 24$	B1	
	(b)		21.9	M1 M1 A1	$x \times f$ using midpoints (dep on previous mark) " $x \times f$ " $\div 40$ accept 22 if working seen
	6		9.54	P1	$10^2 - 5^2 (=75)$
				P1	"75" + $4^2 (=91)$
7	(a)		(1, 4)	B1	
	(b)		-0.4, 2.4	B1	
	(c)		3.75	B1	accept 3.7 – 3.8
8			6 : 2 : 1	M1	for correct interpretation of any one statement eg. 3 : 1; 1 : 0.5
				A1	accept any equivalent ratio eg. 3 : 1 : 0.5

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9		<p>P1 translate into algebra for rectangle: $4x+4x+3x+4+3x+4$ ($=14x+8$) or for trapezium: $5x+5x+x-3+7x-3$ ($=18x-6$)</p> <p>P1 equating: eg $18x-6=14x+8$ ($4x=14$)</p> <p>A1 solving for x: $x=14/4 = 3.5$ oe</p> <p>P1 process to find area: “3.5” \times 3+4 (ft) or “3.5” \times 4 ft</p> <p>A1 cao</p>
10 (a)		<p>P1 for start to process eg. 2000×1.025 ($=2050$)</p> <p>P1 for process to use all given information eg “2050” $\times m^2 = 2124.46$ or “2050” $\times \left(1 + \frac{x}{100}\right)^2 = 2124.46$</p> <p>P1 for process to find their unknown eg $m = \sqrt{\frac{2124.46}{2050}}$ ($=1.01799\dots$)</p> <p>A1 for 1.79% – 1.8 %</p> <p>M1 $225 \div 1.125$ oe</p> <p>A1</p>
(b)		<p>1.8%</p> <p>200</p>

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11		<p>29°</p> <p>C1 angle $OTP = 90^\circ$, quoted or shown on the diagram</p> <p>M1 method that leads to $180 - (90 + 32)$ or 58 shown at <i>TOP</i> OR that leads to 122 shown at <i>SOT</i></p> <p>M1 complete method leading to “58”\div2 or $(180 - “122”) \div 2$ or 29 shown at <i>TSP</i></p> <p>C1 for angle of 29° clearly indicated and appropriate reasons linked to method eg angle between <u>radius</u> and <u>tangent</u> = 90° and sum of <u>angles</u> in a <u>triangle</u> = 180°; <u>ext angle</u> of a <u>triangle</u> <u>equal</u> to sum of <u>int opp angles</u> and <u>base angles</u> of an <u>isos triangle</u> are <u>equal</u> or <u>angle</u> at <u>centre</u> = <u>2x angle</u> at <u>circumference</u> or <u>ext angle</u> of a <u>triangle</u> <u>equal</u> to sum of <u>int opp angles</u></p>
12		<p>0.4,0.6</p> <p>0.3,0.7,0.8,0.2</p> <p>B with correct probabilities</p> <p>B1 correctly placing probs for light A eg 0.4, 0.6</p> <p>B1 correctly placing probs for light B eg 0.3, 0.7, 0.8, 0.2</p> <p>P1 (ft) eg 0.4×0.3 or 0.6×0.8 or $1 - (0.28 + 0.12)$</p> <p>P1 both sets of correct probability calculations</p> <p>C1 Correct interpretation of results with correct comparable results</p>
13		<p>20</p> <p>M1 Establishing method linked to proportion eg $d = k \div c$ or $25 = k \div 280$</p> <p>M1 (dep) substitution eg $d = 7000 \div 350$ or $25 \times 280 \div 350$ oe</p> <p>A1 cao</p>

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14	$\begin{aligned} &(4n^2+2n+2n+1) \\ &\quad - (2n+1) = \\ &4n^2+4n+1-2n-1 \\ &= 4n^2 + 2n \\ &= 2n(2n + 1) \end{aligned}$	proof (supported)	<p>M1 for 3 out of 4 terms correct in the expansion of $(2n + 1)^2$ or $(2n + 1)\{(2n + 1) - 1\}$</p> <p>P1 for $4n^2 + 2n$ or equivalent expression in factorised form</p> <p>C1 for convincing statement using $2n(2n + 1)$ or $2(2n^2 + n)$ or $4n^2 + 2n$ to prove the result</p>
15		$\frac{23}{90}$	<p>M1 For a fully complete method as far as finding two correct decimals that, when subtracted, give a terminating decimal (or integer) and showing intention to subtract eg $x = 0.2\dot{5}$ so $10x = 2.5\dot{5}$ then $9x = 2.3$ leading to...</p> <p>A1 correct working to conclusion</p>
16		$\frac{2x+1}{3x+5}$	<p>M1 for $(3x \pm 5)(2x \pm 1)$ or $(2x + 1)(2x - 1)$</p> <p>M1 $\frac{1}{(3x \pm 5)(2x \pm 1)} \times (2x + 1)(2x - 1)$</p> <p>A1</p>
17		4.89	<p>M1 $\frac{40}{360} \times 2 \times \pi \times 7$ oe</p> <p>A1 4.8 – 4.9</p>

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18			0.229 With Explanation	<p>B1 Finding bound of s: 3.465 or 3.475 or 3.474999... or Finding bound of t: 8.1315 or 8.1325 or 8.132499...</p> <p>P1 Use of "upper bound" and "lower bound" in equation</p> <p>P1 Process of choosing correct bounds eg $\frac{\sqrt{3.475}}{8.1315}$ or $\frac{\sqrt{3.465}}{8.1325}$</p> <p>A1 For 0.2292... and 0.2288.. from correct working</p> <p>C1 For 0.229 from 0.2292.. and 0.2288.. since both LB and UB round to 0.229</p>
19	(a)		Sketch	P1 Parabola passes through all three of the points (0, 4), (2, 0), (4, 4)
	(b)		Sketch	P1 Parabola passes through all three of the points (-4, -1), (-2, 2), (0, -1)
20			$x=0, y=5$ $x=-4, y=-3$	<p>M1 Initial process of substitution eg $x^2 + (2x + 5)^2 = 25$</p> <p>M1 for expanding and simplifying eg $x^2 + 4x^2 + 10x + 10x + 25 = 25$</p> <p>M1 Use of factorisation or correct substitution into quadratic formula or completing the square to solve an equation of the form $ax^2 + bx + c = 0, a \neq 0$</p> <p>A1 correct values of x or y</p> <p>C1 $x = 0, x = -4, y = 5, y = -3$ correctly matched x and y values</p>

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21	(a)		130	<p>P1 start to process eg draw a labelled triangle or use of sine rule $\frac{\sin Q}{8.7} = \frac{\sin 32}{5.2}$</p> <p>P1 process to find of Q eg $Q = \sin^{-1} \left[\frac{\sin 32}{5.2} \times 8.7 \right]$</p> <p>P1 process to find area of triangle PRQ.</p> <p>A1 22.5 – 22.6</p> <p>C1 angle PRQ is obtuse so need to find area of two triangles.</p>
	(b)			
22			1361	<p>P1 process using similar triangles to find base of small cone eg. 4 cm used as diameter or 2 cm used as radius</p> <p>P1 process to find volume of one cone</p> <p>P1 complete process to find volume of frustum</p> <p>P1 complete process to find mass or 1360 – 1362</p> <p>A1 1361 or 1360 or 1400</p>

