

Paper 1MA1: 1H			Notes
Question	Working	Answer	
1			
a		$y(y + 27)$	B1
b		$t^6$	B1
c		$w^5$	B1
2			
	$16 \div 4$	$\frac{5}{8}$	P1 Using side lengths of 4
	$\frac{1 \times 4}{2} = 2$ or $\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$		P1 Method to find fraction or area for one unshaded triangle
	$\frac{2 \times 4}{2} = 4$ or $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$		P1 Method to complete fraction or area for total unshaded region
	$\frac{1 \times 4}{2} + \frac{2 \times 4}{2} = 6$ or $\frac{1}{2} \times \frac{1}{4} + \frac{1}{2} \times \frac{1}{2} = \frac{3}{8}$		P1 Method to find total fraction or area for shaded region
	$16 - 6 = 10$ or $1 - \frac{3}{8} = \frac{5}{8}$		A1 for $\frac{5}{8}$ or 0.625

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3 a	$\frac{1}{6} \times \frac{1}{5} \times 30 \times 5 = 5$ $\left(\frac{5}{6} \times \frac{1}{5} + \frac{1}{6} \times \frac{4}{5} + \frac{1}{6} \times \frac{1}{5}\right) \times 30 \times 2$ $30 - 5 = 20$	5	<p>P1 for identifying correct process to find probabilities for winning scores. May include use of tree diagram or sample space</p> <p>P1 for correct process to find prize money</p> <p>P1 for completing correct process to find profit</p> <p>A1</p>
b		Explanation	<p>C1 for appropriate comment to interpret result eg probability so only likelihood not certainty, other than 30 may play, £5 is small difference.</p>
4		No with reasoning	<p>M1 Derive <math>AC=9</math> cm and identify as hypotenuse</p> <p>M1 <math>4^2 + 7^2</math></p> <p>A1 for using eg <math>AC = \sqrt{4^2 + 7^2}</math> or 65 and 81</p> <p>C1 for concluding explanation that <math>ABC</math> is not a right-angled triangle with evidence.</p>
5		500g	<p>P1 <math>\frac{1}{8} \times 160 (=20)</math></p> <p>P1 <math>'20' \times 25</math></p> <p>A1 500 (or 0.5)</p> <p>B1 Correct units g (or kg)</p>

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6 a		$7\frac{1}{2}$	M1 $\frac{9}{4} \times \frac{10}{3}$ oe M1 $\frac{90}{12}$ oe A1 $7\frac{1}{2}$
b		$5\frac{1}{4} + 6\frac{2}{3}$ or $5\frac{2}{3} + 6\frac{1}{4}$	B1 $5\frac{1}{4} + 6\frac{2}{3}$ or $5\frac{2}{3} + 6\frac{1}{4}$
7	$\frac{90}{2} \times 3 = 135$ $\frac{84}{60} \times 100 = 140$	Combination with reason	P1 Links either $\frac{2}{3}$ with 90 and 60% with 84 P1 Process to find original price of microwave oven eg $\frac{90}{2} \times 3 (=135)$ P1 Process to find original price of combination oven eg $\frac{84}{60} \times 100 (=140)$ A1 Correct original prices £135 and £140 with interpretation of results to conclude that combination oven had greater normal price.
8		4 - 4.5	B1 Rounds appropriately using two of 5, 2 or 7 M1 $\sqrt{19}$ A1 4 - 4.5

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9	$x \times 2x \times 3x =$	Reasoning to reach $x \leq 5$	M1 Starts reasoning to find volume in terms of $x$ M1 Gives inequality $6x^3 \leq 900$ or substitutes 5 and 6 into $6x^3$ M1 Completes reasoning to show $x \leq 5$
10		9	M1 Finds constant $36 \times 1.5 (=54)$ or $\frac{6}{1.5}=4$ M1 $54 \div 6$ or $36 \div 4$ A1 9 cao
11	$\frac{4}{3 \times 2} \pi x^3 + \frac{4}{3} \pi x^3 = 2 \pi x^3$ $(2x)^2 \pi h = 4x^2 \pi h$ $4x^2 \pi h = 2 \pi x^3$	$h = \frac{x}{2}$	P1 Process to find volume of cone or hemisphere P1 Process to total volume of solid P1 Process to find volume of cylinder P1 Equates 2 volumes A1 Reaches $h = \frac{x}{2}$
12		Complete proof	M1 Begins proof $BAE=ACD$ and $ABE=EDC$ M1 $AB = DC$ because opposite sides of a parallelogram are equal C1 Completes proof with all reasons eg alternate angles are equal and reference to ASA

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13		more than	<p>C1 Makes reference to different numbers of girls and boys</p> <p>C1 Completes reasoning eg there are more (boys) with 80% than (girls) with 70% or correct mean <math>(700+1200) \div 25 = 76</math></p>
14		Completes reasoning	<p>M1 Expansion of <math>(4 - \sqrt{3})(4 + \sqrt{3})</math> with at least 3 terms out of 4 correct or <math>4^2 - \sqrt{3} \times \sqrt{3}</math></p> <p>C1 for <math>\sqrt{13}</math> from correct working</p>
15		200	B1 $200$ or $2 \times 10^2$
a		3	B1 12 and $\frac{1}{4}$
b			A1 3 cao
c		-2	M1 $81 = 3^4$ or $\frac{1}{81} = 3^{-4}$
			A1 cao
16		Events independent	C1 Statement that events are independent

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17		$3 \pm \sqrt{17}$	<p>M1 For <math>(x-3)^2 - 9 - 8 (=0)</math> or <math>(x =) \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(-8)}}{2(1)}</math> allow sign error for <math>b</math></p> <p>M1 For <math>x - 3 = \pm \sqrt{17}</math> or <math>x = \frac{6 \pm \sqrt{68}}{2}</math></p> <p>A1 cao</p>
18		48	<p>P1 Identifies that <math>16 \div 8 = 2</math> so <math>PL=2NP</math></p> <p>P1 Process to find area of <math>LMN</math> <math>8 \times (2+1)^2 (=72)</math></p> <p>P1 Completes process to find area of <math>LQM</math> <math>'72' - 16 - 8</math></p> <p>A1 48 cao</p>
19 i		18	<p>M1 Uses frequency density for under 80 bar eg <math>7 \div 10</math></p> <p>M1 Completes method to find over 105 minutes frequency eg <math>1.2 \times 15</math> or <math>\frac{3}{4} \times (1.2 \times 20)</math></p> <p>A1 18 cao</p>
ii		Reasoning	<p>C1 Correct explanation about grouped data so actual values between 100 and 120 unknown</p>

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20		3x	<p>M1 Factorising numerator and denominator of first fraction <math>\frac{3(x+2)}{(x-5)(x+2)}</math> (<math>= \frac{3}{(x-5)}</math>)</p> <p>M1 Factorising denominator of second fraction <math>\frac{x+5}{x(x+5)(x-5)}</math> (<math>= \frac{1}{x(x-5)}</math>)</p> <p>M1 Multiplication by reciprocal <math>\frac{3(x+2)}{(x-5)(x+2)} \times \frac{x(x+5)(x-5)}{(x+5)}</math></p> <p>A1 Completing algebra to reach 3x</p>
21		$x < -3, x > 6$	<p>M1 Rearrange to <math>x^2 - 3x - 18 &gt; 0</math></p> <p>M1 Correct method to solve <math>x^2 - 3x - 18 = 0</math></p> <p>M1 Establish critical values -3 and 6</p> <p>A1 <math>x &lt; -3, x &gt; 6</math></p>
22		60	<p>P1 process to start problem eg draw diagram and find gradient of OA (<math>= 3</math>)</p> <p>P1 process to find equation of tangent with <math>m = -1/3</math></p> <p>P1 process to find x-axis intercept of tangent</p> <p>P1 process to find area of triangle</p> <p>A1 cao</p>