

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

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

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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	a	200	B1 200 or $2 \times 10^2$
	b	3	<p>B1 12 and <math>\frac{1}{4}</math></p> <p>A1 3 cao</p>
	c	-2	<p>M1 <math>81 = 3^4</math> or <math>\frac{1}{81} = 3^{-4}</math></p> <p>A1 cao</p>
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> '72' - <math>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 <math>3x</math></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 <math>-3</math> and <math>6</math></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 <math>OA</math> (<math>= 3</math>)</p> <p>P1 process to find equation of tangent with <math>m = -1/3</math></p> <p>P1 process to find <math>x</math>-axis intercept of tangent</p> <p>P1 process to find area of triangle</p> <p>A1 cao</p>