Paper 1MA1: 1H			
Question	**Working**	**Answer**	**Notes**
1 a		$y(y + 27)$	B1
b		t^6	B1
c		w^5	B1
2	$16 \div 4$ $\frac{1\times4}{2}=2$ or $\frac{1}{2}\times\frac{1}{4}=\frac{1}{8}$ $\frac{2\times4}{2}=4$ or $\frac{1}{2}\times\frac{1}{2}=\frac{1}{4}$ $\frac{1\times4}{2}+\frac{2\times4}{2}=6$ 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 winnng scores. May include use of tree diagram or sample space P1 for correct process to find prize money P1 for completing correct process to find profit A1
b		Explanation	C1 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 Derive AC=9 cm and identify as hypotenuse M1 $4^2 + 7^2$ A1 for using eg $AC = \sqrt{4^2 + 7^2}$ or 65 and 81 C1 for concluding explanation that ABC is not a right-angled triangle with evidence.
5		500g	P1 $\frac{1}{8}\times 160$ (=20) P1 '20' × 25 A1 500 (or 0.5) B1 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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Question	**Working**	**Answer**	**Notes**
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 36×1.5 (=54) or $\frac{6}{1.5}=4$ M1 $54 \div 6$ or $36 \div 4$ A1 9 cao
11	$\frac{4}{3\times2}\pi x^3+\frac{4}{3}\pi x^3=2\pi x^3$ $(2x)^2 \pi h = 4x^2 \pi h$ $4x^2 \pi h = 2\pi x^3$	$h=\frac{x}{2}$	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	C1 Makes reference to different numbers of girls and boys C1 Completes reasoning eg there are more (boys) with 80% than (girls) with 70% or correct mean (700+1200)÷25 = 76
14		Completes reasoning	M1 Expansion of $(4-\sqrt{3})(4+\sqrt{3})$ with at least 3 terms out of 4 correct or $4^2-\sqrt{3}\times\sqrt{3}$ C1 for $\sqrt{13}$ from correct working
15 a		200	B1 200 or 2×10^2
b		3	B1 12 and $\frac{1}{4}$ 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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Question		**Working**	**Answer**	**Notes**
17			$3 \pm \sqrt{17}$	M1 For $(x-3)^2 - 9 - 8\ (=0)$ or $(x=)\frac{-(-6)\pm\sqrt{(-6)^2-4(1)(-8)}}{2(1)}$ allow sign error for b M1 For $x - 3 = \pm\sqrt{17}$ or $x = \frac{6\pm\sqrt{68}}{2}$ A1 cao
18			48	P1 Identifies that $16 \div 8 = 2$ so $PL=2NP$ P1 Process to find area of LMN $8 \times (2+1)^2\ (=72)$ P1 Completes process to find area of LQM '72'−16 − 8 A1 48 cao
19	i		18	M1 Uses frequency density for under 80 bar eg 7÷10 M1 Completes method to find over 105 minutes frequency eg 1.2 ×15 or $\frac{3}{4}\times(1.2\times20)$ A1 18 cao
	ii		Reasoning	C1 Correct explanation about grouped data so actual values between 100 and 120 unknown

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