Paper 1MA1: 1H				
Question	**Working**	**Answer**	**Notes**	
1		42	P1 process to start problem solving eg forms an appropriate equation P1 complete process to solve equation A1 cao	
2		4 m^2	B1 substitution into formula eg $1.5 = \frac{12}{A}$ A1 4 (oe) stated C1 (indep) units stated	
3		0.22	P1 begins process of subtraction of probabilities from 1 A1 oe	
4		48	P1 begins to work with rectangle dimensions eg $l+w=7$ or $2\times l+w$ (=11) C1 shows a result for a dimension eg using $l=4$ or $w=3$ P1 begins process of finding total area eg 4 × "3" × "4" A1 cao	
5		explanation	M1 works with volume eg 240000 M1 uses conversion 1 litre = 1000 cm^3 M1 uses 8000 eg vol ÷ 8000 (=30) M1 uses "30" eg "30" × 2.50 C1 for explanation and 75 stated	begins working back eg 70÷2.50 uses conversion 1 litre = 1000 cm^3 uses 8000 eg "28"× 8000 (=224000) works with vol. eg 224000 for explanation with 240000 and 224000

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6 (a)		Sharif	B1	Sharif with mention of greatest total throws
(b)		No (supported)	P1	starts working with proportions
			A1	Conclusion: correct for Paul, but not for the rest; or ref to just Paul's results
(c)	Tot: H 300 T 100	$\frac{9}{16}$	P1	selects Sharif or overall and multiplies P(heads)×P(heads) eg ¾ × ¾
			A1	oe
7 (a)		$\frac{\sqrt{3}}{2}$	B1	
(b)		6	M1	starts process eg $\sin 30 = \frac{x}{12}$
			A1	answer given
8 (a)		5.7×10^{26} to 6×10^{26}	B1	uses estimates eg 1.899 to 1.9 or 2
			M1	process of multiplication eg 0.57×10^{27}
			A1	between 5.7×10^{26} and 6×10^{26}
(b)		explanation	C1	eg underestimate a number is rounded up
9		'Yes' with correct working	P1	begins process of working with mean eg 35×10 (=350) or 33×11 (=363) or 10×(35−33) (=20) or 11×(35−33) (=22)
			P1	(dep) finding the difference eg "363"−"350", or 33 – "20" or 35 – "22"
			C1	'Yes' with 13 from correct working

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10 (a)		5	P1 begins to work with scaling factors (eg 5) or ÷6 A1 cao
(b)		10	P1 works with 1:2 ratio eg no. red counters is 30÷2 (=15) A1 ft
11		25	B1 cao
12		37.5 mph	P1 shows process of finding first distance eg 50 × 3 (=150) P1 shows process of finding time for second part eg 150 ÷ 30 (=5 h) P1 shows process of working with av sp. (dist ÷ time) (= 300÷(3+5) = 300÷8) C1 conclusion with supporting evidence, correct notation and units eg 37.5 mph
13		$k = \sqrt[3]{4m^2 - 1}$ or $\sqrt[3]{(2m+1)(2m-1)}$	M1 clear fractions or remove sq rt sign M1 (dep) clear fractions and remove sq rt sign A1 $k = \sqrt[3]{4m^2 - 1}$ or $\sqrt[3]{(2m+1)(2m-1)}$
14		$\frac{-2}{13}$	M1 multiplies all terms by 2 or 3 to reconcile fractions M1 complete process of expanding brackets and isolating x term A1 cao
15		$\frac{2x-5}{x+5}$	M1 factorising to give $(2x - 5)(x + 1)$ M1 factorising to give $(x + 5)(x + 1)$ A1 cao

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Question	**Working**	**Answer**	**Notes**
16		D, A, B, C	B1 for at least 2 correct B1 for all correct
17		SAS	M1 links PQR and PRQ (eg isosceles triangle) with full reasons M1 links TR and SQ with full reasons C1 gives full conclusion for congruency eg SAS
18		75π	P1 starts process by using $\frac{250}{3}\pi$ and $\frac{1}{2}\times\frac{4}{3}\pi r^3$ to find radius as 5 P1 starts process using ½ curved surface area eg $(4 \times \pi \times 5^2) \div 2$ P1 complete process shown eg $(4 \times \pi \times 5^2) \div 2 + (\pi \times 5^2)$ A1 for 75π
19		$\sqrt{31}$	M1 expands brackets eg $36 + 6\sqrt{5} - 6\sqrt{5} - \sqrt{25}$ (=31) M1 rationalises the denominator eg using $\sqrt{31}$ with numerator & denominator A1 for $\sqrt{31}$

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Question	**Working**	**Answer**	**Notes**		
20		proof (supported)	M1 M1 A1 C1	for any two consecutive integers expressed algebraically eg $n + 1$ and n (dep) for the difference between the squares of "two consecutive integers" expressed algebraically eg $(n + 1)^2 - n^2$ for correct expansion and simplification of difference of squares eg $2n + 1$ for showing statement is correct (with supportive evidence) eg $n + n + 1 = 2n + 1$ and $(n + 1)^2 - n^2 = 2n + 1$	for sight of $p^2 - q^2 = (p - q)(p + q)$ for deduction that $p - q = 1$ for linking these two statements eg substitution of 1 for $p - q$ for fully stated proof and deduction eg $p^2 - q^2 = 1 \times (p + q) = p + q$
21		$\frac{10x - x^2}{45}$	P1 P1 P1 P1 A1	for $\frac{x}{10}$ or $\frac{10-x}{10}$ or $\frac{x-1}{9}$ or $\frac{10-x}{9}$ or $\frac{x}{9}$ or $\frac{9-x}{9}$ seen on diagram or in a calculation for $\frac{x}{10} \times \frac{10-x}{9}$ or $\frac{10-x}{10} \times \frac{x}{9}$ for $\frac{x}{10} \times \frac{10-x}{9} + \frac{10-x}{10} \times \frac{x}{9}$ for beginning to process the algebra $\frac{10x - x^2}{45}$ oe	for $\frac{x}{10} \times \frac{x-1}{9} + \frac{10-x}{10} \times \frac{9-x}{9}$ for $1 - (\frac{x}{10} \times \frac{x-1}{9} + \frac{10-x}{10} \times \frac{9-x}{9})$

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Question	**Working**	**Answer**	**Notes**
22			M1 states AB as $6\mathbf{b} - 3\mathbf{a}$ M1 for $AX = \frac{1}{3}AB$ or $\frac{1}{3}$"$(6\mathbf{b} - 3\mathbf{a})$" or ft to $2\mathbf{b} - \mathbf{a}$ M1 for $\overrightarrow{CY} = \overrightarrow{CB} + \overrightarrow{BY} = 6\mathbf{b} + 5\mathbf{a} - \mathbf{b}$ $(=5\mathbf{b} + 5\mathbf{a})$ M1 for $\overrightarrow{CX} = 3\text{a} +$ "2b – a" or $\overrightarrow{CX} = 6\text{b} - \frac{2}{3}$"$(6\mathbf{b} - 3\mathbf{a})$" $(= 2\mathbf{a} + 2\mathbf{b})$ C1 for $\frac{2}{5}\overrightarrow{CY} = \frac{2}{5}(5\mathbf{a} + 5\mathbf{b}) = 2(\mathbf{a} + \mathbf{b}) = \overrightarrow{CX}$
23		$y = -\frac{1}{2}x + \frac{3}{2}$	P1 for a process to find the gradient of the line AB P1 (dep) for a process to find the gradient of a perpendicular line eg use of $-1/m$ P1 (dep on P2) for substitution of $x=5$, $y=-1$ A1 equation stated oe