

Paper 1MA1: 2H				
Question	Working	Answer	Notes	
1		Translation by $(\begin{smallmatrix} 4 \\ -3 \end{smallmatrix})$	B1 for translation B1 $(\begin{smallmatrix} 4 \\ -3 \end{smallmatrix})$	
2 (a)  (bi)  (bii)		Trend described  13 - 17  No + reason	C1 for “percentage of people who use the shop decreases” oe  P1 for process to draw trend line on graph  A1 for 13 - 17  C1 for comment, eg “no, because 2020 is beyond the time period covered by the given data”	
3 (a)  (b)		$13y - 1$  $35u^3w^7$	M1 for expansion of one bracket A1 for full simplification  B1 for 2 of 35, $u^3$ and $w^7$ correct B1 cao	
4		105	P1 for process to find the exterior angle or interior angle of a hexagon or octagon P1 for process to find the both exterior angles or both interior angles A1 for 105 from correct working	

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5 (a)(i)  (ii)  (b)		10, 12, 14, 15, 16, 18  12, 18  $\frac{7}{10}$	B1  B1  M1	cao  cao  for 7 or indicating correct region or for 10, 14, 16, 11, 13, 17, 19 listed
			A1	for $\frac{7}{10}$ oe
6	$6 : 5 = 12 : 10$ $2 : 1 = 10 : 5$ $C : S : P = 12 : 10 : 5$  $\frac{10}{27} \times 189$	70	P1  P1  A1	P1 for strategy to start to solve the problem eg 12 : 10 and 10: 5  P1 for process to solve the problem eg $\frac{10}{27} \times 189$  A1 cao
7	$\frac{1}{4} \times \pi \times 4.8^2$ $\frac{1}{2} \times 4.8 \times 4.8$ $\frac{1}{4} \times \pi \times 4.8^2 - \frac{1}{2} \times 4.8 \times 4.8$	6.58	B1  P1  A1	for use of formula for area of a circle  for complete process to find area of shaded region  for $6.56 - 6.58$

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8 (a)  (b)		explanation	C1	for “incorrect expansion of brackets” oe
		explanation	C1	for “has not obtained both solutions” oe
9 (a)  (b)  (c)		18	B1	cao
		$5(x - 1)$	M1 A1	for method to find inverse function for $5(x - 1)$ or $5x - 5$
		$9x - 48$ shown	M1 A1	for method to find composite function for working leading to $9x - 48$
10 (a)  (b)(i)  (ii)	$1560000 \times (1.052)^2$	1730000	P1 P1 A1	for process to find population in 2016 for complete process to find population in 2017 for $1725000 - 1730000$
		2020	P1 A1	for process to find when population will exceed 2 000 000 for 2020
			C1	for correct comment on how assumption will affect the answer, eg if the percentage growth is higher the population may exceed 2 000 000 earlier.

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11 (a)		0.43	M1 A1	for use of graph at 240 minutes for 0.42 – 0.44 oe
		comparison	B1 B1 C1 C1	for at least one median (249 – 252 or 273 – 276) for least one interquartile range (69 – 73 or 67 - 71) for comment comparing average times eg females take longer than males oe for comment comparing spreads of times from IQRs, eg the spread of times is about the same
12 (a)	$25 \times 24$	600	P1 A1	for process to find number of ways cao
		2400	P1 P1 A1	for process to find number of lists with boy then girl then boy or the number of lists with girl then boy then girl for complete process to find the total number of lists cao

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13		119	M1 M1 A1	for $1.06 \times 100$ oe for $1.06^3 \times 100$ oe accept 119.1016
14		explanation	C1	for a correct evaluation, eg the value of $D$ should be multiplied by 8, she has used $2 \times 3$ instead of $2^3$
15 (a)  (b)  (c)		1.0 – 1.3  limitation	M1 M1 A1  C1 C1  C1	for finding gradient by drawing tangent for method to calculate gradient For 1.0 – 1.3  for acceleration for eg “4 second after the start of the race”, “when the speed is 7.6 m/s”, “in $\text{m/s}^2$ ”  for comment, eg dependent on accuracy of constructing a tangent
16 (i)  (ii)		200  5.6	B1  B1	cao  For 5.6(2...)

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17	$\sqrt{8.35^2 - 6.05^2}$	5.754997828	B1 for finding bounds of one measurement, 8.25 8.35, 6.05 or 6.15 P1 for process of choosing and using correct bounds P1 for process of Pythagoras' rule with correct bounds A1 for 5.754(997...)
18	$(\sqrt{a} + 2\sqrt{b})(\sqrt{a} - 2\sqrt{b})$ $\sqrt{a} \times \sqrt{a} - 2\sqrt{a}\sqrt{b} +$ $2\sqrt{b}\sqrt{a} - 2\sqrt{b} \times 2\sqrt{b}$	$a - 4b$	M1 for expansion of brackets or $\sqrt{4b} = 2\sqrt{b}$ M1 for $a$ or $(-4b)$ A1 cao
19 (a)  (b)(i)  (ii)		sketch  sketch  sketch	B1 for correct shape for $0 \leq x \leq 360$ B1 for fully correct sketch with labels  B1 cao  B1 cao

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20	$\angle TSU = 360 \div 5 (=72)$ Exterior angles of a polygon add up to $360^\circ$ $\angle QRO = \angle OTP = 90$ The tangent to a circle is perpendicular ( $90^\circ$ ) to the radius (diameter) $\angle ROT = 540 - 2 \times 90 - 2 \times 108 (= 144)$ $\angle RUT = 144 \div 2 (= 72)$ The angle at the centre of a circle is twice the angle at the circumference Base angles of an isosceles triangle are equal	proof	M1 for method to find interior or exterior angle of regular pentagon M1 for using angle between tangent and radius M1 for method to find angle $ROT$ C1 for method to find angle $RUT$ with reason C1 for deduction that $ST = UT$ with reasons
21	$\frac{2x - 1}{x - 4} = \frac{16x + 1}{2x - 1}$ $(2x - 1)^2 = (16x + 1)(x - 4)$ $12x^2 - 59x - 5 = 0$ $(12x + 1)(x - 5) = 0$	$-\frac{1}{12}, 5$	P1 for process to write as an equation P1 for process to clear the fractions P1 for process to write equation in form $ax^2 + bx + c = 0$ P1 for process to solve the equation A1 cao