Paper 1MA1: 2H			
Question	**Working**	**Answer**	**Notes**
1		Translation by $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$	B1 for translation B1 $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$
2 (a)		Trend described	C1 for "percentage of people who use the shop decreases" oe
(bi)		13 - 17	P1 for process to draw trend line on graph A1 for 13 - 17
(bii)		No + reason	C1 for comment, eg "no, because 2020 is beyond the time period covered by the given data"
3 (a)		$13y - 1$	M1 for expansion of one bracket A1 for full simplification
(b)		$35u^3w^7$	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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Question	**Working**	**Answer**	**Notes**
5 (a)(i)		10, 12, 14, 15, 16, 18	B1 cao
(ii)		12, 18	B1 cao
(b)		$\frac{7}{10}$	M1 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 for strategy to start to solve the problem eg 12 : 10 and 10: 5 P1 P1 for process to solve the problem eg $\frac{10}{27} \times 189$ A1 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 for use of formula for area of a circle P1 for complete process to find area of shaded region A1 for 6.56 – 6.58

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Question	**Working**	**Answer**	**Notes**
8 (a)		explanation	C1 for "incorrect expansion of brackets" oe
(b)		explanation	C1 for "has not obtained both solutions" oe
9 (a)		18	B1 cao
(b)		$5(x - 1)$	M1 for method to find inverse function A1 for $5(x - 1)$ or $5x - 5$
(c)		$9x - 48$ shown	M1 for method to find composite function A1 for working leading to $9x - 48$
10 (a)	$1560000 \times (1.052)^2$	1730000	P1 for process to find population in 2016 P1 for complete process to find population in 2017 A1 for 1725000 - 1730000
(b)(i)		2020	P1 for process to find when population will exceed 2 000 000 A1 for 2020
(ii)			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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Question		Working	Answer	Notes
11	(a)		0.43	M1 for use of graph at 240 minutes A1 for 0.42 – 0.44 oe
	(b)		comparison	B1 for at least one median (249 – 252 or 273 – 276) B1 for least one interquartile range (69 – 73 or 67 - 71) C1 for comment comparing average times eg females take longer than males oe C1 for comment comparing spreads of times from IQRs, eg the spread of times is about the same (NB – at least one of the comments must be in context)
12	(a)	25 × 24	600	P1 for process to find number of ways A1 cao
	(b)	12 × 10 × 11 10 × 12 × 9 1320 + 1080	2400	P1 for process to find number of lists with boy then girl then boy or the number of lists with girl then boy then girl P1 for complete process to find the total number of lists A1 cao

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

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Question	**Working**	**Answer**	**Notes**
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)		sketch	B1 for correct shape for $0 \leqslant x \leqslant 360$ B1 for fully correct sketch with labels
(b)(i)		sketch	B1 cao
(ii)		sketch	B1 cao

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Question	**Working**	**Answer**	**Notes**
20	∠ *TSU* = 360 ÷ 5 (=72) Exterior angles of a polygon add up to 360° ∠ *QRO* = ∠ *OTP* = 90 The tangent to a circle is perpendicular (90°)to the radius (diameter) ∠ *ROT* = 540 – 2 × 90 – 2 × 108 (= 144) ∠ *RUT* = 144 ÷ 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