| Paper 1MA1: 2H | | | |
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| **Question** | **Working** | **Answer** | **Notes** |
| 1 | | Translation by $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$ | B1 for translation<br>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<br>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<br>A1 for full simplification |
| (b) | | $35u^3w^7$ | B1 for 2 of 35, $u^3$ and $w^7$ correct<br>B1 cao |
| 4 | | 105 | P1 for process to find the exterior angle or interior angle of a hexagon<br>P1 for process to find the both exterior angles or both interior angles<br>A1 for 105 from correct working |

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| 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<br>2 : 1 = 10 : 5<br>C : S : P = 12 : 10 : 5<br>$\frac{10}{27} \times 189$ | 70 | P1 P1 for strategy to start to solve the problem eg 12 : 10 and 10: 5<br>P1 P1 for process to solve the problem eg $\frac{10}{27} \times 189$<br>A1 A1 cao |
| 7 | $\frac{1}{4} \times \pi \times 4.8^2$<br>$\frac{1}{2} \times 4.8 \times 4.8$<br>$\frac{1}{4} \times \pi \times 4.8^2 - \frac{1}{2} \times 4.8 \times 4.8$ | 6.58 | B1 for use of formula for area of a circle<br>P1 for complete process to find area of shaded region<br>A1 for 6.56 – 6.58 |

| Paper 1MA1: 2H | | | | |
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| 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<br>A1 for $5(x - 1)$ or $5x - 5$ |
| | (c) | | $9x - 48$ shown | M1 for method to find composite function<br>A1 for working leading to $9x - 48$ |
| 10 | (a) | $1560000 \times (1.052)^2$ | 1730000 | P1 for process to find population in 2016<br>P1 for complete process to find population in 2017<br>A1 for 1725000 - 1730000 |
| | (b)(i) | | 2020 | P1 for process to find when population will exceed 2 000 000<br>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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| 11 | (a) | | 0.43 | M1 for use of graph at 240 minutes<br>A1 for 0.42 – 0.44 oe |
| | (b) | | comparison | B1 for at least one median (249 – 252 or 273 – 276)<br>B1 for least one interquartile range (69 – 73 or 67 - 71)<br>C1 for comment comparing average times eg females take longer than males oe<br>C1 for comment comparing spreads of times from IQRs, eg the spread of times is about the same<br><br>(NB – at least one of the comments must be in context) |
| 12 | (a) | $25 \times 24$ | 600 | P1 for process to find number of ways<br>A1 cao |
| | (b) | $12 \times 10 \times 11$<br>$10 \times 12 \times 9$<br>$1320 + 1080$ | 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<br>P1 for complete process to find the total number of lists<br>A1 cao |

| Paper 1MA1: 2H | | | |
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| **Question** | **Working** | **Answer** | **Notes** |
| 13 | | 119 | M1 for $1.06 \times 100$ oe<br>M1 for $1.06^3 \times 100$ oe<br>A1 accept 119.1016 |
| 14 | | explanation | C1 for a correct evaluation, eg the value of $D$ should be multiplied by 8, she has used $2 \times 3$ instead of $2^3$ |
| 15 (a) | | 1.0 – 1.3 | M1 for finding gradient by drawing tangent<br>M1 for method to calculate gradient<br>A1 For 1.0 – 1.3 |
| (b) | | | C1 for acceleration<br>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...) |

| Paper 1MA1: 2H | | | |
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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<br>P1 for process of choosing and using correct bounds<br>P1 for process of Pythagoras' rule with correct bounds<br>A1 for 5.754(997…) |
| 18 | $(\sqrt{a} + 2\sqrt{b})(\sqrt{a} - 2\sqrt{b})$<br>$\sqrt{a} \times \sqrt{a} - 2\sqrt{a}\sqrt{b} +$<br>$2\sqrt{b}\sqrt{a} - 2\sqrt{b} \times 2\sqrt{b}$ | $a - 4b$ | M1 for expansion of brackets or $\sqrt{4b} = 2\sqrt{b}$<br>M1 for $a$ or $(-4b)$<br>A1 cao |
| 19 (a) | | sketch | B1 for correct shape for $0 \leqslant x \leqslant 360$<br>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 | $\angle TSU = 360 \div 5$ (=72)<br>Exterior angles of a polygon add up to $360^o$<br>$\angle QRO = \angle OTP = 90$<br>The tangent to a circle is perpendicular ($90^o$)to the radius (diameter)<br>$\angle ROT = 540 - 2 \times 90 - 2 \times 108$ (= 144)<br>$\angle RUT = 144 \div 2$ (= 72)<br>The angle at the centre of a circle is twice the angle at the circumference<br>Base angles of an isosceles triangle are equal | proof | M1 for method to find interior or exterior angle of regular pentagon<br>M1 for using angle between tangent and radius<br>M1 for method to find angle *ROT*<br>C1 for method to find angle *RUT* with reason<br>C1 for deduction that *ST* = *UT* with reasons |
| 21 | $\frac{2x-1}{x-4} = \frac{16x+1}{2x-1}$<br>$(2x-1)^2 = (16x+1)(x-4)$<br>$12x^2 - 59x - 5 = 0$<br>$(12x+1)(x-5) = 0$ | $-\frac{1}{12}$, 5 | P1 for process to write as an equation<br>P1 for process to clear the fractions<br>P1 for process to write equation in form $ax^2 + bx + c = 0$<br>P1 for process to solve the equation<br>A1 cao |