| **Paper 1MA1: 2H** |  |  |
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| **Question** | **Working** | **Answer** | **Notes** |
| 1 |  |  | Translation by$\left(\genfrac{}{}{0pt}{}{4}{-3}\right)$ | B1 | for translation  |
|  |  |  |  | B1 | $$\left(\genfrac{}{}{0pt}{}{4}{-3}\right)$$ |
| 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) |  | 13*y* − 1 | M1 | for expansion of one bracket |
|  |  |  |  | A1 | for full simplification |
|  | (b) |  | 35*u*3*w*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 : 102 : 1 = 10 : 5 | 70 | P1 | P1 for strategy to start to solve the problem eg 12 : 10 and 10: 5 |
|  |  | C : S : P = 12 : 10 : 5 |  | P1 | P1 for process to solve the problemeg $\frac{10}{27} $ × 189 |
|  |  | $\frac{10}{27} $ × 189 |  | A1 | A1 cao |
| 7 |  | $\frac{1}{4}$ × π × 4.8² | 6.58 | B1 | for use of formula for area of a circle |
|  |  | $\frac{1}{2}$ × 4.8 × 4.8 |  | P1 | for complete process to find area of shaded region |
|  |  | $\frac{1}{4}$ × π × 4.8² − $\frac{1}{2}$ × 4.8 × 4.8 |  | 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 5*x* − 5 |
|  | (c) |  | 9*x* – 48 shown | M1 | for method to find composite function |
|  |  |  |  | A1 | for working leading to 9*x* – 48 |
| 10 | (a) | 1560000 × (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 × 91320 + 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 1.063 × 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 2³ |
| 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/s2” |
|  | (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 |  | $$\sqrt{8.35²-6.05²}$$ | 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}$ − $2\sqrt{b}$) | *a* – 4*b* | M1 | for expansion of brackets or   |
|  |  | $\sqrt{a}$ ×$ \sqrt{a}$ − $2\sqrt{a}\sqrt{b}$ + $2\sqrt{b}\sqrt{a}$ − $2\sqrt{b}$ × $2\sqrt{b}$ |  | M1 | for *a* or (– 4*b*) |
|  |  |  |  | A1 | cao |
| 19 | (a) |  | sketch | B1 | for correct shape for 0 ⩽ *x* ⩽ 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 360o | proof | M1 | for method to find interior or exterior angle of regular pentagon  |
|  |  | ⦟ *QRO* = ⦟ *OTP* = 90The tangent to a circle is perpendicular (90o)to the radius (diameter) |  | M1 | for using angle between tangent and radius  |
|  |  | ⦟ *ROT* = 540 – 2 × 90 – 2 × 108 (= 144) |  | M1 | for method to find angle *ROT* |
|  |  | ⦟ *RUT* = 144 ÷ 2 (= 72)The angle at the centre of a circle is twice the angle at the circumference |  | C1 | for method to find angle *RUT* with reason |
|  |  | Base angles of an isosceles triangle are equal |  | C1 | for deduction that *ST* = *UT* with reasons |
| 21 |  | $\frac{2x - 1 }{x - 4 }$ = $\frac{16x + 1 }{2x - 1}$ | –$\frac{1}{12}$, 5 | P1 | for process to write as an equation |
|  |  | (2*x* – 1)² = (16*x* + 1)( *x* – 4) |  | P1 | for process to clear the fractions |
|  |  | 12*x*² – 59*x* – 5 = 0 |  | P1 | for process to write equation in form a*x*² + b*x* + c = 0 |
|  |  | (12*x* + 1)( *x* – 5) = 0 |  | P1 | for process to solve the equation |
|  |  |  |  | A1 | cao |