

**1MA1 Practice papers Set 4: Paper 3H (Regular) mark scheme – Version 1.0**

| Question |  | Working  | Answer | Mark | Notes   |
|----------|--|--|--------|------|---|
| 1.       |  |  | 50     | 3    | <p>M1 for <math>625 \div 250 (= 2.5)</math> or <math>360 \div 120 (= 3)</math> or <math>1000 \div 300 (= 3\frac{1}{3})</math></p> <p>M1 for correct method to calculate the number of cookies for one ingredient, e.g. <math>625 \div 250</math> or <math>2.5</math> or <b>and</b> <math>20 \times "2.5"</math></p> <p>A1 cao</p>   |
| 2.       |  | $0.65 \times 80 = 52$<br><br>$\frac{5}{8} \times 80 = 50$<br><br>$52 - 50$ | 2      | 4    | <p>M1 for method to calculate the time Celina sings</p> <p>M1 for method to calculate the time Zoe sings</p> <p>M1(dep on at least M1) for finding the difference between two times</p> <p>A1 cao</p>   |
| 3.       |  |  | 80     | 4    | <p>B1 for <math>EBF = 50</math> or <math>ABE = 50</math></p> <p>M1 for angles given that can lead to <math>x = 80</math> as the next step<br/>                     e.g. <math>EBF = 50</math> and <math>ABE = 50</math><br/>                     e.g. <math>EBF = 50</math> and <math>BFG = 100</math><br/>                     e.g. <math>EBF = 50</math> and <math>BFE = 80</math><br/>                     e.g. <math>EBF = 50</math> and <math>DEB = 130</math> and <math>ABE = 50</math></p> <p>A1 cao</p> <p>C1 for stating correct reasons appropriate to their method shown</p> |

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| 4.       | (a)     | $c^8 k^{20}$           | 1    | B1   |
|          | (b)     | $12x^2 - 3x + 20x - 5$ | 2    | B2 for fully correct<br><br>(B1 for 3 out of 4 terms correct in working including signs OR 4 terms correct, ignore signs. In a grid the 20x need not be signed)  |
|          | (c)     | $(x - 5)(x + 2) = 0$   | 3    | M1 for $(x \pm 5)(x \pm 2)$<br><br>A1 for $(x - 5)(x + 2) (= 0)$<br><br>B1 ft (dep on M1) for $x = 5$ and $-2$   |
| 5.       |         | 508                    | 5    | M1 for correct use of Pythagoras theorem,<br>e.g. $12^2 + x^2 = 16^2$ or $16^2 - 12^2$<br><br>M1 for $\sqrt{16^2 - 12^2}$ (= 10.583...)<br><br>M1 for area = $\frac{1}{2} \times 12 \times \sqrt{16^2 - 12^2}$ (= 63.498...)<br><br>M1 for volume = $8 \times \frac{1}{2} \times 12 \times \sqrt{16^2 - 12^2}$ or $8 \times$ “63.498”<br><br>A1 for answer in range 507.8 to 508 |

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| <b>6.</b> | $3p^2 = y + 4$ $p^2 = \frac{y+4}{3}$   | $p = \sqrt{\frac{y+4}{3}}$ | 3    | M1 for clear intention to add 4 to both sides or divide all terms by 3 (with at least 3 terms)<br><br>M1 for clear intention to find the square root from $p^2 = (\text{expression in } y)$<br><br>A1 for $p = \sqrt{\frac{y+4}{3}}$ (oe) (accept $\pm$ a correct root) |
| <b>7.</b> |  | 68                         | 3    | M1 for $30 \times 60 (= 1800)$ or $20 \times 56 (= 1120)$<br><br>M1 for $(\text{“1800”} - \text{“1120”}) \div 10$<br><br>A1 cao   |
| <b>8.</b> | (i) $160 - 90 = 70;$<br>$180 - 90 - 70$<br><br>or<br>$180 - 160$<br><br>(ii) | 20                         | 3    | M1 for $180 - 90 - (160 - 90)$ or $180 - 90 - 70$ or $180 - 160$ (oe)<br><br>A1 cao<br><br>B1 for <u>angles in a triangle</u> add up to <u>180°</u> or <u>alternate angles</u> are equal  |

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| <b>9.</b>  | (a) |   | 0.8 on 1 <sup>st</sup> branch<br>0.3 and 0.05 on 2 <sup>nd</sup><br>branches | 2    | B1 0.8 oe on 1st branch<br><br>B1 0.3 and 0.05 (oe) on 2nd branches   |
|            | (b) | $0.2 \times 0.3$  | 0.06   | 2    | M1 $0.2 \times '0.3'$<br><br>A1 0.06 ft from '0.3' in the tree diagram  |
| <b>10.</b> |     | $425 \div 17 = 25$<br>Flour : $8 \times 25 = 200\text{g}$<br>Butter : $4 \times 25 = 100\text{g}$<br>Jam : $5 \times 25 = 125\text{g}$<br>Total weight for 200 rolls:<br>$= \text{total grams} \times 200 \div 1000$<br><br>Flour: $200 \times 0.2 = 40 \text{ kg}$<br>Butter : $100 \times 0.2 = 20 \text{ kg}$<br>Jam : $125 \times 0.2 = 25 \text{ kg}$<br><br>Total cost = $40 \times 40\text{p}$<br>$+ 20 \times \text{£}2.50 + 25 \times \text{£}1$<br>$= \text{£}16 + \text{£}50 + \text{£}25$ | 91   | 6    | M1 for $425 \div '8+4+5'$ or 25 seen<br><br>M1 for two of $8 \times 25 (=200), 4 \times 25 (=100), 5 \times 25 (=125)$<br><br>M1 for two of ' $200' \times 200 (= 40\ 000),$<br>' $100' \times 200 (= 20\ 000)$ ' $125' \times 200 (= 25\ 000)$<br><br>M1 for converting g to kg (at least two ingredients)<br>(= 40, 20, 25)<br><br>M1 for ' $40' \times 40\text{p} + '20' \times \text{£}2.50 + '25' \times \text{£}1$<br>(= $\text{£}16 + \text{£}50 + \text{£}25$ )<br><br>A1 for 91 or 91.00 |

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| <b>11.</b> | (a)     | 100 – 67   | 33             | 2     | M1 for use of graph at 50 years or sight of 66, 67, 68<br><br>A1 for 32,33,34   |
|            | (b)     | Median = 44 – 44.5<br>LQ = 32 – 33, UQ = 51.5 – 52 | Box plot drawn | 4     | B4 for fully correct box plot<br><br>(B3 for 4 correct values plotted including box and tails)<br><br>(B2 for 3 correct values plotted including box and tails or 5 correct values plotted and no box and tails)<br><br>(B1 for 2 correct values plotted including box and tails or for a correct median or quartile)   |
|            | (c)     |  | comparison     | 2     | B2(ft) for at least two of :<br><br>Comparison of a measure of location, e.g. median age of male teachers is less than median age of female teachers<br><br>Comparison of spread, e.g. IQR for male teachers is greater than IQR for female teachers or the ranges are the same<br><br>Comparison of skewness, e.g. the age distribution of female teachers is more negatively skewed than the age distribution of male teachers<br><br>(B1 ft for one of them) |

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| <b>12.</b> | $\frac{100}{360} \times \pi \times 6.8 \times 2$  | 25.5            | 3    | M1 for $\frac{100}{360} \times \pi \times 6.8 \times 2$ (=11.86..)<br><br>M1 for “11.86” + 2 × 6.8 (oe)<br><br>A1 for answer in the range 25.4 – 25.6 |
| <b>13.</b> | (a)   | 11              | 1    | B1  |
|            | (b) $y = 2x + 5$ $x = 2y + 5$<br>$y - 5 = 2x$ $x - 5 = 2y$                              | $\frac{x-5}{2}$ | 2    | M1 for a correct first stage – subtract 5 from both sides or divide all terms by 2<br><br>A1 for $\frac{x-5}{2}$ (oe)                                 |
|            | (c)   | -16             | 1    | B1 cao  |
|            | (d)(i) $(2x+5)^2 - 25$<br>$4x^2 + 10x + 10x + 25$ oe                                    | $4x^2 + 20x$    | 5    | M1<br>B1 for correct expansion of $(2x+5)^2$<br><br>A1 for a correct fully or partially factorised expression   |
|            | (d)(ii) $4x(x+5) (=0)$<br>or $x(4x+20) (=0)$<br>or $2x(2x+10) (=0)$<br>or $x(x+5) (=0)$ | $x = 0, x = -5$ |      | M1 for, e.g., $\frac{-20 \pm \sqrt{20^2 - 4 \times 4 \times 0}}{2 \times 4}$<br><br>A1 for both solutions   |

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| 14.      | <p><i>d</i>: UB = 54.5 (or 54.499),<br/>LB = 53.5</p> <p><i>C</i>: UB = 170.5 (or<br/>170.499), LB = 169.5</p> <p>170.5 ÷ 53.5<br/>169.5 ÷ 54.5</p> | <p>3.19<br/>3.11..</p> | 4    | <p>B1 for any one correct bound quoted</p> <p>M1 for 170.5 ÷ 53.5 or 169.5 ÷ 54.5</p> <p>A1 for UB = answer in range 3.18 to 3.19 from correct working</p> <p>A1 for LB = 3.11.. from correct working</p>  |
| 15.      | $\frac{3(x+1)}{6} + \frac{2(x+3)}{6} = \frac{3x+3+2x+6}{6}$   | $\frac{5x+9}{6}$       | 3    | <p>M1 Use of common denominator of 6 (<b>or</b> any other multiple of 6) and at least one numerator correct, e.g. <math>\frac{3(x+1)}{6}</math> or <math>\frac{2(x+3)}{6}</math></p> <p>M1 <math>\frac{3(x+1)}{6} + \frac{2(x+3)}{6}</math> (oe)</p> <p>A1 cao</p>   |
| 16.      |   |                        | 4    | <p>M1 for angle <math>MXY = \text{angle } NYX</math><br/>Reason = 'base angles of an isosceles triangle are equal' (oe)</p> <p>M1 for <math>MX = NY</math><br/>Reason = 'M and N divide the equal sides XZ and YZ in equal parts' (oe)</p> <p>C1 for either reason quoted above or 'XY is common'</p> <p>C1 for All reasons correct and SAS seen</p> |

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| 17.      | $x + 1 : 3 : x - 1$<br><br>( $\times 10$ )<br>$10x + 10 : 30 : 10x - 10$<br><br>$10x + 10 + 30 + 10x - 10 = 60$<br><br>$20x = 30$<br><br>$x = 1.5$ | 1.5    | 5    | M2 for $10 \times (x + 1)$ and $10 \times (x - 1)$<br><br>(M1 for $x + 1 + 3 + x - 1$ or $2x + 3$ oe or $x + 1 + x - 1 = 30$ or $x = 15$ )<br><br>M1 for ' $10x + 10$ ' + $30$ + ' $10x - 10$ ' = $60$ or ' $10x + 10$ ' + ' $10x - 10$ ' = $30$ oe<br><br>M1 for an attempt to reduce the form $ax = b$ (condone one error)<br><br>A1 cao |
| 18.      | $4n^2 + 12n + 3^2 - (4n^2 - 12n + 3^2)$<br><br>$= 4n^2 + 12n + 9 - 4n^2 + 12n - 9$<br><br>$= 24n$<br><br>$= 8 \times 3n$                           | Proof  | 3    | M1 for 3 out of 4 terms correct in expansion of either $(2n + 3)^2$ or $(2n - 3)^2$<br><br>A1 for $24n$ from correct expansion of both brackets<br><br>A1 (dep on A1) for $24n$ is a multiple of 8 or $24n = 8 \times 3n$ or $24n \div 8 = 3n$   |



National performance data from Results Plus

| Original source of questions |       |       |              |     | Max score                           | Mean score of students achieving grade: |      |      |      |      |      |      |      |
|------------------------------|-------|-------|--------------|-----|-------------------------------------|---|------|------|------|------|------|------|------|
| Qn                           | Spec  | Paper | Session YYMM | Qn  |                                     | Topic                                   | ALL  | A*   | A    | B    | C    | D    | E    |
| 1                            | 2MB01 | 2H    | 1411         | Q03 | Ratio                               | 3                                       | 2.10 | 2.50 | 2.33 | 2.35 | 2.21 | 1.50 | 1.00 |
| 2                            | 1MA0  | 2H    | 1511         | Q05 | Fractions, percentages and decimals | 4                                       | 2.40 | 3.92 | 3.78 | 3.54 | 2.97 | 2.14 | 0.97 |
| 3                            | 2MB01 | 2H    | 1406         | Q07 | Angles and parallel lines           | 4                                       | 2.25 | 3.45 | 3.10 | 2.70 | 1.96 | 1.08 | 0.52 |
| 4                            | 1380  | 2H    | 1106         | Q18 | Solve quadratic equations           | 6                                       | 2.66 | 5.75 | 4.51 | 2.55 | 1.11 | 0.35 | 0.10 |
| 5                            | 5AM2  | 2H    | 1506         | Q13 | Pythagoras in 2D                    | 5                                       | 2.61 | 4.72 | 3.88 | 2.52 | 1.11 | 0.28 | 0.08 |
| 6                            | 1MA0  | 2H    | 1306         | Q18 | Rearranging equations               | 3                                       | 1.01 | 2.73 | 2.28 | 1.43 | 0.44 | 0.07 | 0.01 |
| 7                            | 2MB01 | 1H    | 1406         | Q11 | Mean, median, mode                  | 3                                       | 1.21 | 2.88 | 2.39 | 1.68 | 0.76 | 0.22 | 0.06 |
| 8                            | 5AM2  | 2F    | 1206         | Q13 | Angles                              | 3                                       | 1.39 |      |      |      | 2.12 | 1.40 | 0.91 |
| 9                            | 5AM2  | 2F    | 1106         | Q20 | Probability tree diagrams           | 4                                       | 0.59 |      |      |      | 1.00 | 1.22 | 0.50 |
| 10                           | 5AM2  | 2H    | 1211         | Q12 | Ratio                               | 6                                       | 3.10 | 5.55 | 4.34 | 3.38 | 2.40 | 1.87 | 0.43 |
| 11                           | 5AM1  | 1H    | 1111         | Q17 | Cumulative frequency diagrams       | 8                                       | 4.59 | 7.33 | 6.15 | 4.50 | 2.95 | 1.85 | 0.00 |
| 12                           | 5MM2  | 2H    | 1106         | Q22 | Area of a circle                    | 3                                       | 0.82 | 2.59 | 2.00 | 0.81 | 0.13 | 0.02 | 0.00 |
| 13                           | 4MA0  | 1H    | 1401         | Q20 | Functions                           | 9                                       | 4.76 | 7.89 | 5.68 | 3.42 | 1.41 | 0.47 | 0.25 |
| 14                           | 1MA0  | 2H    | 1306         | Q23 | Bounds                              | 4                                       | 0.83 | 3.66 | 2.49 | 0.85 | 0.13 | 0.01 | 0.00 |
| 15                           | 1MA0  | 2H    | 1211         | Q20 | Simplify algebraic expressions      | 3                                       | 0.49 | 2.36 | 1.79 | 0.84 | 0.19 | 0.03 | 0.00 |
| 16                           | 5MM2  | 2H    | 1506         | Q23 | Congruence and similarity           | 4                                       | 1.09 | 2.86 | 1.80 | 0.61 | 0.15 | 0.03 | 0.10 |
| 17                           | 5MM2  | 2H    | 1111         | Q16 | Ratio                               | 5                                       | 1.14 | 3.17 | 2.11 | 1.01 | 0.34 | 0.25 | 0.00 |
| 18                           | 1MA0  | 2H    | 1206         | Q21 | Algebraic proof                     | 3                                       | 0.29 | 1.78 | 0.49 | 0.14 | 0.04 | 0.02 | 0.00 |
|                              |       |       |              |     |                                     | <b>80</b>                               |      |      |      |      |      |      |      |