<table>
<tr><th colspan="6">1MA1 Practice Tests Set 1: Paper 1H (Regular) mark scheme – Version 1.0</th></tr>
<tr><th colspan="2">Question</th><th>Working</th><th>Answer</th><th>Mark</th><th>Notes</th></tr>
<tr><td>1.</td><td></td><td>
54<br>24<br>216<br>1080<br>1296
<table>
<tr><td></td><td>5</td><td>4</td><td></td></tr>
<tr><td>1</td><td>1 / 0</td><td>8</td><td>2</td></tr>
<tr><td>2</td><td>2 / 0</td><td>1 / 6</td><td>4</td></tr>
</table>
9 6
<table>
<tr><td></td><td>50</td><td>4</td></tr>
<tr><td>20</td><td>1000</td><td>80</td></tr>
<tr><td>4</td><td>200</td><td>16</td></tr>
</table>
1000 + 200 + 80 + 16 = 1296
<table>
<tr><td>5</td><td>0.4</td><td></td></tr>
<tr><td>1</td><td>0.08</td><td>0.2</td></tr>
<tr><td>0.2</td><td>0.016</td><td>0.04</td></tr>
</table>
1 + 0.2 + 0.08 + 0.016 = 1.296
</td><td>1.296</td><td>3</td><td>
M1 for a complete method with relative place value correct. Condone 1 multiplication error, addition not necessary.<br><br>
OR<br><br>
M1 for a complete grid. Condone 1 multiplication error, addition not necessary.<br><br>
OR<br><br>
M1 for sight of a complete partitioning method, condone 1 multiplication error. Final addition not necessary.<br><br>
A1 for sight of digits 1296(00...)<br>
A1 (dep on M1, but not previous A1) for correct placement of decimal point in their product.<br><br>
[SC:B2 for digits 1296(00...) seen if M0 scored]
</td></tr>
</table>

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|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| **2.** | | | $71.5 \leq H < 72.5$ | 2 | B1 71.5<br><br>B1 72.5 |

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|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| **3.** | | $6 \times 10 \times 8 = 480$<br>$480 \div (6 \times 20) =$ | 4 | 3 | M1 for $6 \times 10 \times 8$ or 480 seen<br>M1 (dep) for '480' $\div (6 \times 20)$ oe<br>A1 cao<br>**OR**<br>M1 for $20 \div 10$ (=2) or $10 \div 20$ ($=\frac{1}{2}$) or $\frac{8}{20}$ oe or $\frac{20}{8}$ oe<br>M1 (dep) for $8 \div$ '2' or $8 \times \frac{1}{2}$ or $\frac{8}{20} \times 10$ oe or $10 \div \frac{20}{8}$<br>A1 cao<br>SC : B2 for answer of 16 coming from $\frac{20 \times 8 \times 6}{10 \times 6}$ oe |

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|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| **4.** | | $0.38 \times 10^{-1}$, $3800 \times 10^{-4}$, $0.038 \times 10^{2}$, 380 | Correct order | 2 | M1 changing any one correctly or at least 3 in the correct order (ignoring one) or reverse order<br><br>A1 for correct order (accept any form) |
| **5.** | (a) | (4,0) (3, 0) (3, –1) (2, –1) (2, 2) (4, 2) | Correct position | 2 | B2 for correct shape in correct position<br>(B1 for any incorrect translation of correct shape) |
| | (b) | | Rotation<br>180°<br>(0,1) | 3 | B1 for rotation<br>B1 for 180° (ignore direction)<br>B1 for (0, 1)<br>OR<br>B1 for enlargement<br>B1 for scale factor −1<br>B1 for (0, 1)<br>(NB: a combination of transformations gets B0) |
| **6.** | (a) | $\frac{(x+2)^2}{x+2} = \frac{(x+2)}{1}$ | $x + 2$ | 1 | B1 $x + 2$ or $\frac{(x+2)}{1}$ |
| | (b) | | $6a^5b^2$ | 2 | B2 cao<br>(B1 exactly 2 out of 3 terms correct in a product or $a^5b^2$ or $6a^{2+3}b^{1+1}$) |

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|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| **7.** | | $180 \div 9 \times 1:180 \div 9 \times 3:180 \div 9 \times 5$<br>$= 20:60:100$<br>Not enough cement<br>(but enough sand and enough gravel)<br>OR<br>$1 \times 15:3 \times 15:5 \times 15$<br>$=15:45:75$<br>$15 + 45 + 75 = 135$<br>$(< 180)$<br>Not enough cement (to make 180kg of concrete) | No + reason | 4 | M1 for $180 \div (1 + 3 + 5)$ ( = 20) or 3 multiples of 1: 3: 5<br>M1 for 1 × ”20” or 3 × ”20” or 5 × ”20” or 20 seen or 60 seen or 100 seen<br>A1 for (Cement =) 20, (Sand =) 60, (Gravel) = 100<br>C1 ft (provided both Ms awarded) for not enough cement oe<br>OR<br>M1 for (1 × 15 and) 3 × 15 and 5 × 15 or 9 × 15 or sight of the numbers 15, 45, 75 together.<br>M1 for ‘15’ + ‘45’ + ‘75’<br>A1 for 135 (< 180)<br>C1 ft (provided both Ms awarded) for not enough cement oe |

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|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| **8.** | | | 25 | 4 | M1 for 600 ÷ 4 (=150)<br>M1 for 4500 ÷ "150" (=30)<br>M1 for 750 ÷ "30"<br>A1 for 25 with supporting working<br>OR<br>M1 for 4500 ÷ 750 (= 6) or 750 ÷ 4500 (= $\frac{1}{6}$)<br>M1 for 600 ÷ 4 (=150) or 600 ÷ "6" (=100) or 600 × "$\frac{1}{6}$" (= 100)<br>M1 for "150" ÷ "6" or "100" ÷ 4 or 150 × "$\frac{1}{6}$"<br>A1 for 25 with supporting working<br>OR<br>M1 for 4500 ÷ 750 (=6) or 750 ÷ 4500 (= $\frac{1}{6}$)<br>M1 for $\frac{1}{4}\times\frac{1}{6}\ \left(=\frac{1}{24}\right)$<br>M1 for "$\frac{1}{24}$" × 600<br>A1 for 25 with supporting working |

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|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| **9.** | (a) | | 15 – 19 | 1 | B1 for 15 – 19 oe (e.g. 15 to 19) |
| | (b) | | Frequency polygon through (2, 8), (7, 11), (12, 9), (17, 14) and (22, 18) | 2 | B2 for a complete and correct polygon (ignore any histograms, any lines below a mark of 2 or above a line of 22, but award B1 only if there is a line joining the first to last point)<br>(B1 for one vertical or one horizontal plotting error<br>OR for incorrect but consistent error in placing the midpoints horizontally (accept end points of intervals)<br>OR for correct plotting of mid-interval values but not joined )<br>Plotting tolerance ± $\frac{1}{2}$ square<br>Points to be joined by lines (ruled or hand-drawn but not curves) |
| **10.** | | $5q + 5p = 4 + 8p$<br>$5q = 4 + 8p - 5p$<br>$5q = 4 + 3p$<br>$q = \frac{4+3p}{5}$ | $q = \frac{4+3p}{5}$ | 3 | M1 for expansion of bracket or $5q + 5p$ or each term ÷ 5<br>M1 for correct process to $aq = bp + c$, $a$ , $b$ and $c$ numbers<br>A1 $q = \frac{4+3p}{5}$ oe<br>[SC B2 for ambiguous answer e.g. $\frac{4+3p}{5}$ ] |

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|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| **11.** | (a) | $x^2 - 3x + 5x - 15$ | $x^2 + 2x - 15$ | 2 | M1 for four correct terms with or without signs, or 3 out of no more than 4 terms with correct signs. The terms may be in an expression or in a table<br>A1 cao |
| | (b) | $(x + 9)(x - 1) = 0$<br><br>OR<br><br>a = 1, b = 8, c = − 9<br>$x = \frac{-8 \pm \sqrt{8^2 - 4 \times 1 \times -9}}{2 \times 1}$<br>$= \frac{-8 \pm \sqrt{100}}{2}$<br><br>OR<br><br>$(x + 4)^2 - 16 - 9$<br>$(x + 4)^2 = 25$<br>$x = -4 \pm \sqrt{25}$ | $x = 1$ or<br>$x = -9$ | 3 | M2 for $(x + 9)(x - 1)$<br>(M1 for $(x \pm 9)(x \pm 1)$)<br>A1 cao<br>OR<br>M1 for correct substitution in formula of 1, 8, ±9<br>M1 for reduction to $\frac{-8 \pm \sqrt{100}}{2}$<br>A1 cao<br><br>OR<br>M1 for $(x + 4)^2$<br>M1 for $-4 \pm \sqrt{25}$<br>A1 cao<br>SC: if no marks score then award B1 for 1 correct root, B3 for both correct roots. |

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|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| **12.** | (a) | $3t + 1 < t + 12$<br>$3t - t < 12 - 1$<br>$2t < 11$ | $t < 5.5$ | 2 | M1 $3t - t < 12 - 1$<br>A1 $t < 5.5$ oe<br>(B1 for $t = 5.5$ or $t > 5.5$ or 5.5 or $t \leq 5.5$ or $t \geq 5.5$ on the answer line) |
| | (b) | | 5 | 1 | B1 for 5 or ft (a) |
| **13.** | | | 54 | 3 | M1 for any correct use of distance, speed, time formulae, e.g. 10 ÷ 40 (= 0.25) or 15 min<br>M1 (dep) for a complete method to find speed from G to H,<br>e.g. 18 ÷ (35 – “15”) × 60 oe<br>A1 cao |
| **14.** | | $M = kL^3$<br>$k = \frac{M}{L^3} = \frac{160}{8} = 20$<br>Where $L = 3$,<br>$M = 20 \times 3^3$ | 540 | 4 | M1 for $M \alpha L^3$ $M = kL^3$<br>A1 $k = 20$<br>M1 for ‘20’ × $3^3$<br>A1 for 540 cao |
| **15.** | (a) | | 25<br>16 | 2 | M1 for correct use of frequency density to find a unit of area (for example 1 $cm^2$ = 2.5 or 1 small square = 0.1) or the area of one block.<br>A1 cao |
| | (b) | | Correct black (1cm high between 40 and 60) | 1 | B1 for correct black |

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|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| | | | | | |
| **16.** | (a) | | 7 | 1 | B1 for 7 (accept –7 or ±7) |
| | (b) | | $3\sqrt{5}$ | 1 | B1 cao |
| **17.** | | | Proof | 3 | M1 for ($x$ =) 0.04545(...)<br>or 1000$x$ = 45.4545(...), accept 1000$x$ = $45.\dot{4}\dot{5}$<br>or 100$x$ = 4.54545(...), accept 100$x$ = $4.\dot{5}\dot{4}$<br>or 10$x$ = 0.4545(...) ,accept 10$x$ = $0.\dot{4}\dot{5}$<br>M1 for finding the difference between two correct, relevant recurring<br>decimals for which the answer is a terminating decimal<br>A1 (dep on M2) for completing the proof by subtracting and<br>cancelling to give a correct fraction e.g. $\frac{45}{990} = \frac{1}{22}$ or $\frac{4.5}{99} = \frac{1}{22}$ |
| **18.** | | | Vertices at<br>(–6, 7)<br>(–3 , 7)<br>(–3, 1) | 3 | B3 fully correct<br>(B2 correct orientation **and** correct size **or** two correct vertices)<br>(B1 correct size **or** correct orientation **or** one correct vertex) |

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|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| **19.** | EE + CC + HH<br><br>**Or**<br><br>EC+EH+CE+CH+HE +HC<br><br>**Or**<br><br>E,not E+ C,not C + H,not H | $\frac{76}{110}$ | 5 | M1 for use of 10 as denominator for 2nd probability<br>M1 for $\frac{4}{11}\times\frac{3}{10}$ *or* $\frac{5}{11}\times\frac{4}{10}$ *or* $\frac{2}{11}\times\frac{1}{10}$<br>M1 for $\frac{4}{11}\times\frac{3}{10}+\frac{5}{11}\times\frac{4}{10}+\frac{2}{11}\times\frac{1}{10}\left(=\frac{34}{110}\right)$<br>M1 (dep on previous M1 for $1-$ ‘$\frac{34}{110}$’<br>A1 for $\frac{76}{110}$ oe<br>**Or**<br>M1 for use of 10 as denominator for 2nd probability<br>M1 for $\frac{4}{11}\times\frac{5}{10}$ or $\frac{4}{11}\times\frac{2}{10}$ or $\frac{5}{11}\times\frac{4}{10}$ or $\frac{5}{11}\times\frac{2}{10}$ or $\frac{2}{11}\times\frac{4}{10}$ or $\frac{2}{11}\times\frac{5}{10}$<br>M2 for $\frac{4}{11}\times\frac{5}{10}+\frac{4}{11}\times\frac{2}{10}+\frac{5}{11}\times\frac{4}{10}+\frac{5}{11}\times\frac{2}{10}+\frac{2}{11}\times\frac{4}{10}+\frac{2}{11}\times\frac{5}{10}$<br>(M1 for at least 3 of these)<br>A1 for $\frac{76}{110}$ oe<br>**Or**<br>M1 for use of 10 as denominator for 2nd probability<br>M1 for $\frac{4}{11}\times\frac{7}{10}$ *or* $\frac{5}{11}\times\frac{6}{10}$ *or* $\frac{2}{11}\times\frac{9}{10}$<br>M2 for $\frac{4}{11}\times\frac{7}{10}+\frac{5}{11}\times\frac{6}{10}+\frac{2}{11}\times\frac{9}{10}$<br>(M1 for two of these added)<br>A1 for $\frac{76}{110}$ oe |

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|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| **20.** | | Gradient of $AB = 2$<br><br>Gradient of perpendicular line $= -\frac{1}{2}$<br><br>$y = -\frac{1}{2}x + c$<br><br>$-1 = -\frac{1}{2} \times 5 + c$<br><br>$c = \frac{3}{2}$ | $y = -\frac{1}{2}x + \frac{3}{2}$ | 4 | M1 for attempt to find gradient of AB<br><br>M1 (dep) for attempt to find gradient of perpendicular line eg use of $-1/m$<br><br>M1(dep on M2) for substitution of $x = 5$, $y = -1$<br><br>A1 for $y = -\frac{1}{2}x + \frac{3}{2}$ oe |
| **21.** | (a) | | Circle, centre $O$, radius 3 | 2 | M1 for a complete circle centre (0, 0)<br>A1 for a correct circle within guidelines |
| | (b) | | $x = 2.6$, $y = -1.6$ or $x = -1.6$, $y = 2.6$ | 3 | M1 for $x + y = 1$ drawn<br>M1 (dep) ft from (a) for attempt to find coordinates for any one point of intersection with a curve or circle<br>A1 for $x = 2.6$, $y = -1.6$ **and** $x = -1.6$, $y = 2.6$ all $\pm 0.1$ |

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|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| **22.** | (a) | $\left(\frac{8}{4}\right)^2 \times 80$ | 320 | 2 | M1 for $\left(\frac{8}{4}\right)^2$ *or* $\left(\frac{4}{8}\right)^2$<br>A1 for 320 cao |
| | (b) | $\left(\frac{4}{8}\right)^3 \times 600$ | 75 | 2 | M1 for $\frac{1}{'\left(\frac{8}{4}\right)'} \times 600$<br>A1 for 75 cao |

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|---|---|---|---|---|---|
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| | | | | | |
| **23.** | | $DE = AE$, and $AE = EB$ (tangents from an external point are equal in length)<br>so $DE = EB$<br><br>$AE = EC$ (given)<br>Therefore<br>$AE = DE = EB = EC$<br>So $DB = AC$<br><br>If the diagonals are equal and bisect each other then the quadrilateral is a rectangle.<br>**OR**<br>If $AE = DE = EB = EC$ then there are four isosceles triangles $ADE$, $AEB$, $BEC$, $DEC$ in which the angles $DAB$, $ABC$, $BCD$, $CDA$ are all the same.<br><br>Since $ABCD$ is a quadrilateral this makes | Proof | 4 | B1 for $DE = AE$ or $AE = EB$<br>(can be implied by triangle $AED$ is isosceles<br>or triangle $AEB$ is isosceles<br>or indication on the diagram)<br>OR tangents from an external point are equal in length<br><br>B1 for $AE = DE = EB = EC$<br><br>B1 for $DB = AC$, (dep on B2)<br>OR consideration of 4 isosceles triangles in $ABCD$<br><br>C1 fully correct proof.<br>Proof should be clearly laid out with technical language correct and fully correct reasons |

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| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| | | all four angles 90°, and *ABCD* must therefore be a rectangle. | | | |

National performance data taken from Results Plus

| Qu | Spec | Paper | Session YYMM | Qu | Topic | Max score | Mean % all | ALL | A* | A | B | C | D | E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2544 | 14H | 0806 | Q02 | Four operations | 3 | 45 | 1.35 | 2.80 | 2.28 | 1.50 | 0.84 | 0.44 | 0.36 |
| 2 | | | | NEW | Bounds | 2 | | | | No data available | | | | |
| 3 | 1MA0 | 1H | 1206 | Q12 | Volume | 3 | 37 | 1.11 | 2.55 | 1.74 | 1.12 | 0.75 | 0.48 | 0.36 |
| 4 | 1MA0 | 1H | 1211 | Q20 | Standard form | 2 | 60 | 1.20 | 1.91 | 1.80 | 1.61 | 1.20 | 0.73 | 0.46 |
| 5 | 1MA0 | 1F | 1306 | Q26 | Translations | 5 | 24 | 1.20 | | | | 2.57 | 1.63 | 1.04 |
| 6 | 1380 | 1H | 1203 | Q15cd | Simplify expressions | 3 | 54 | 1.62 | 2.80 | 2.46 | 1.98 | 1.33 | 0.74 | 0.45 |
| 7 | 1MA0 | 1H | 1211 | Q13 | Ratio | 4 | 44 | 1.76 | 3.77 | 3.45 | 2.78 | 1.60 | 0.61 | 0.16 |
| 8 | 1MA0 | 1H | 1411 | Q14 | Ratio | 4 | 31 | 1.23 | 3.63 | 3.20 | 2.46 | 1.34 | 0.65 | 0.24 |
| 9 | 1380 | 1H | 1006 | Q08 | Frequency diagrams | 3 | 51 | 1.53 | 2.63 | 2.13 | 1.49 | 0.96 | 0.56 | 0.34 |
| 10 | 1380 | 1H | 0911 | Q16 | Rearranging equations | 3 | 44 | 1.33 | 2.88 | 2.57 | 1.70 | 0.77 | 0.32 | 0.11 |
| 11 | 1380 | 1H | 1011 | Q23 | Solve quadratic equations | 5 | 36 | 1.82 | 4.62 | 3.60 | 2.22 | 1.07 | 0.43 | 0.17 |
| 12 | 1380 | 1H | 0906 | Q20 | Solve inequalities | 3 | 50 | 1.51 | 2.87 | 2.40 | 1.51 | 0.64 | 0.18 | 0.06 |
| 13 | 1MA0 | 1H | 1506 | Q14 | Compound measures | 3 | 34 | 1.03 | 2.58 | 1.94 | 1.30 | 0.64 | 0.23 | 0.09 |
| 14 | 1380 | 1H | 0906 | Q21 | Direct and inverse proportion | 4 | 45 | 1.81 | 3.88 | 3.27 | 1.62 | 0.51 | 0.10 | 0.03 |
| 15 | 2540 | 1H | 0811 | Q23 | Histograms and grouped frequency | 3 | 20 | 0.60 | 2.63 | 1.56 | 0.56 | 0.23 | 0.19 | 0.18 |
| 16 | 2540 | 1H | 0811 | Q25 | Index notation | 2 | 21 | 0.41 | 1.83 | 1.16 | 0.48 | 0.12 | 0.03 | 0.02 |
| 17 | 1MA0 | 1H | 1506 | Q21 | Recurring decimals | 3 | 22 | 0.66 | 2.57 | 1.69 | 0.67 | 0.16 | 0.04 | 0.01 |
| 18 | 5MM1 | 1H | 1306 | Q22 | Enlargement | 3 | 25 | 0.74 | 2.33 | 1.20 | 0.50 | 0.14 | 0.06 | 0.06 |
| 19 | 1MA0 | 1H | 1303 | Q24 | Selection with and without replacement | 5 | 16 | 0.79 | 4.43 | 2.96 | 1.10 | 0.22 | 0.04 | 0.01 |
| 20 | 2MB01 | 2H | 1211 | Q16 | Equations of lines | 4 | 22 | 0.86 | 2.94 | 2.15 | 0.73 | 0.20 | 0.01 | 0.02 |
| 21 | 1380 | 1H | 1011 | Q28 | Graphs of circles | 5 | 12 | 0.60 | 3.57 | 1.24 | 0.38 | 0.11 | 0.03 | 0.02 |
| 22 | 2540 | 1H | 0806 | Q24 | Congruence and similarity | 4 | 15 | 0.60 | 2.95 | 0.94 | 0.19 | 0.06 | 0.04 | 0.03 |
| 23 | 2MB01 | 2H | 1103 | Q16 | Proof | 4 | 2 | 0.07 | | No grade data available | | | | |
| | | | | | | **80** | | | | | | | | |