**IGCSE (9–1) Maths - practice paper 5H mark scheme**

**Results Plus data on 90 of the 100 marks:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Paper 5** |  |  |  |  | **Edexcel averages:** |  |  |  |  |  |
| **Year** | **Paper** | **Qu. no** | **New qu. no.** | **Mean score** | **Max score** | **Mean %** |  | **ALL** | **A\*** | **A** | **B** | **C** | **D** | **E** |
| 1701 | 3HR | Q01 | Q01 | 1.08 | 2 | 54.0 |  | 1.08 | 1.62 | 1.14 | 0.55 | 0.31 | 0.16 | 0.24 |
| 1701 | 3HR | Q07 | Q02 | 3.49 | 4 | 87.3 |  | 3.49 | 3.96 | 3.97 | 3.53 | 2.98 | 1.34 | 0.32 |
| 1701 | 3HR | Q08 | Q03 | 3.90 | 5 | 78.0 |  | 3.90 | 4.80 | 4.26 | 3.51 | 2.56 | 1.66 | 1.00 |
| 1706 | 3HR | Q08 | Q04 | 2.09 | 3 | 69.7 |  | 2.09 | 2.78 | 2.45 | 1.97 | 1.38 | 0.67 | 0.21 |
| 1701 | 3HR | Q09 | Q05 | 3.05 | 4 | 76.3 |  | 3.05 | 3.64 | 3.34 | 2.77 | 2.17 | 1.43 | 1.00 |
| 1701 | 3HR | Q10 | Q06 | 2.73 | 4 | 68.3 |  | 2.73 | 3.83 | 3.10 | 2.28 | 0.87 | 0.15 | 0.00 |
| 1701 | 4HR | Q08 | Q07 | 2.14 | 3 | 71.3 |  | 2.14 | 2.88 | 2.53 | 1.77 | 0.90 | 0.18 | 0.12 |
| 1701 | 4HR | Q10 | Q08 | 2.19 | 4 | 54.8 |  | 2.19 | 3.33 | 2.17 | 1.34 | 0.65 | 0.14 | 0.08 |
| 1701 | 4HR | Q11 | Q09 | 1.23 | 2 | 61.5 |  | 1.23 | 1.85 | 1.37 | 0.67 | 0.31 | 0.13 | 0.00 |
| 1701 | 3HR | Q11a-b | Q10 | 4.39 | 5 | 87.8 |  | 4.39 | 4.96 | 4.75 | 4.50 | 3.71 | 2.19 | 0.96 |
| 1701 | 4HR | Q12 | Q11 | 5.14 | 7 | 73.4 |  | 5.14 | 6.70 | 5.70 | 4.00 | 2.86 | 1.63 | 0.69 |
| 1701 | 4HR | Q13 | Q12 | 2.74 | 4 | 68.5 |  | 2.74 | 3.69 | 2.89 | 2.33 | 1.47 | 0.55 | 0.00 |
| Spec pprs | 2H | Q14 | Q13 |  | 5 |  |  |  |  |  |  |  |  |  |
| 1701 | 4HR | Q14 | Q14 | 4.82 | 7 | 68.9 |  | 4.81 | 6.68 | 5.41 | 3.79 | 1.98 | 0.39 | 0.00 |
| 1701 | 4HR | Q15 | Q15 | 5.43 | 7 | 77.6 |  | 5.43 | 6.76 | 6.26 | 4.95 | 3.35 | 1.56 | 0.43 |
| 1701 | 4HR | Q16 | Q16 | 1.62 | 3 | 54.0 |  | 1.62 | 2.54 | 1.50 | 0.87 | 0.44 | 0.16 | 0.15 |
| 1701 | 4HR | Q17 | Q17 | 2.55 | 4 | 63.8 |  | 2.55 | 3.71 | 2.73 | 1.89 | 0.83 | 0.13 | 0.00 |
| 1701 | 4HR | Q18 | Q18 | 2.04 | 5 | 40.8 |  | 2.04 | 3.68 | 1.47 | 0.64 | 0.13 | 0.04 | 0.00 |
| 1701 | 4HR | Q19 | Q19 | 3.10 | 5 | 62.0 |  | 3.10 | 4.55 | 3.41 | 2.16 | 0.90 | 0.07 | 0.00 |
| 1701 | 4HR | Q20 | Q20 | 3.26 | 6 | 54.3 |  | 3.26 | 5.40 | 3.00 | 1.25 | 0.56 | 0.28 | 0.00 |
| 1701 | 4HR | Q21 | Q21 | 3.47 | 6 | 57.8 |  | 3.47 | 5.56 | 3.50 | 1.89 | 0.33 | 0.13 | 0.04 |
| SAMs | 1H | Q23 | Q22 |  | 5 |  |  |  |  |  |  |  |  |  |
|  |  |  |  | **60.46** | **90** | **67.2** |  | **60.45** | **82.92** | **64.95** | **46.66** | **28.69** | **12.99** | **5.24** |

**Problem-solving questions: 6, 7, 11, 19, 21, 22**

**Reasoning questions: 8, 10, 13, 16, 21**

| Q | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 1 |  | 1002 or 10 000  |  |  | M1 | e.g. 12 × 100² |
|  |  |  | 120 000 | 2 | A1 |  |
|  |  |  |  |  |  | **Total 2 marks** |

| 2 |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *x* | −2 | −1 | 0 | 1 | 2 | 3 | 4 |
| *y* | 10 | 8 | 6 | 4 | 2 | 0 | −2 |

 | *y* = 6 – 2*x* drawn from *x* = −2 to*x* = 4 | 4 | B4 | For a correct line between *x* = −2 and *x* = 4 |
|  |  |  |  |  | B3 | For a correct straight line segment through at least 3 of (−2, 10) (−1, 8) (0, 6) (1, 4) (2, 2) (3, 0) (4,−2)**OR** for all of (−2, 10) (−1, 8) (0, 6) (1, 4) (2, 2) (3, 0) (4, −2)plotted but not joined |
|  |  |  |  |  | B2 | For at least 2 correct points plotted  |
|  |  |  |  |  | B1 | For at least 2 correct points stated (may be in a table) **OR**for a line drawn with a negative gradient through (0, 6) **OR** a line with gradient −2 |
|  |  |  |  |  |  | **Total 4 marks** |

| 3 | a | 224 ÷ 8 oe |  | 2 | M1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 28 |  | A1 |  |
|  | b | 523 – 411 (=112) or or (=127.3...)  |  | 3 | M1 |  |  |
|  |  |  or 100×“1.273” – 100 or “127.3” – 100 |  |  | M1 | dep |  |
|  |  |  | 27.3 |  | A1 | 27.25 – 27.3 |
|  |  |  |  |  |  | **Total 5 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **4a** |  | Correct triangle(−1, −2) (−1, 0) (2, −2) |  | 2 | B2(B1 for a rotation of 90o clockwise about a different centrei.e. a triangle in the same orientation as the correct triangle **or**rotation by 90o anticlockwise about (0, 2)) |
| **b** |  | Correct trapezium(1, −1) (1, −2) (3, 1) (3, −2) |  | 1 | B1 |
|  |  |  |  |  | **Total 3 marks** |

| 5 | a |  | 100 < *w* ≤ 110 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | b | 85 × 3 + 95 × 5 + 105 × 7 + 115 × 4 + 125255 + 475 + 735 + 460 + 125 |  | 3 | M2 | for frequency × mid-interval for at least 4 products multiplied consistently and summingIf not M2 then award M1 for multiplying consistently by value within intervals for at least 4 products (eg. end of interval) and summing products **or** mid-intervals used but not summed. |
|  |  |  | 2050 |  | A1 | SC : B2 for an answer of 102.5  |
|  |  |  |  |  |  | **Total 4 marks** |

| 6 |  | 182 – (14÷2)2 (=275) |  | 4 | M1 |  | **or** M1 for cos*x* = **or** sin*y* =**or**   |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  or  or  or 16.5… or 16.6 |  |  | M1 |  | **or** M1 for *x* = cos -1  **or** *x* = 67.1…**or** *y* =  **or** *y* = 22.8…**or** *z* **=**  **or** *z*= 45.77... |
|  |  | 0.5 × 14 × “16.5…” or 35 |  |  | M1 |  | **or** M1 for 0.5×14×18×sin(“67.1…”) **or**0.5×18×18×sin(2×”22.8…”) **or** 0.5×18×18×sin(“45.77...”) |
|  |  |  | 116 |  | A1 | 116 – 116.1  NB Allow use of Hero’s formula |
|  |  |  |  |  |  | **Total 4 marks** |
|  |  | Alternative scheme |  |  |  |  |
|  |  | 25(25 – 18)(25 – 18)(25 – 14)(= 13475) oe  |  | 4 | M2 |  |
|  |  | √13475 oe |  |  | M1 |  |
|  |  |  | 116 |  | A1 |  |
|  |  |  |  |  |  | **Total 4 marks** |

| 7 |  | 160 $–$ 3*x* + 7*x* $–$ 20 = 180 or2(160 – 3*x*) + 2(7*x* $–$ 20) = 360 oe |  | 3 | M1 | For a correct equation |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | e.g. 4*x* = 180 – 140 or – 3*x* + 7*x* = 180 + 20 – 160 or 4*x* =40 or 14*x* – 6*x* = 360 – 320 + 40 oe |  |  | M1 | For isolating the terms in *x* in a correct equation |
|  |  |  | 10 |  | A1  | Dep on at least M1 |
|  |  |  |  |  |  | **Total 3 marks** |

| 8 | (a) |  |  | 2 | M1 | For with *a* = 4 or *b* = 3 |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 111375 |  | A1 | Accept  oe |
|  | (b) |  |  | 2 | M1 | For  or  (and no 11) or *n* × 33 × 5² where *n* ≠ 11 |
|  |  |  | 2025 |  | A1 | Accept  oe |
|  |  |  |  |  |  | **Total 4 marks** |

| 9 |  |  | *y* = $–$2*x* + 1 | 2 | M1A1  | For *y* = $–$2*x* + *c* (*c* $\ne $ 1) or*y* = *mx* + 1or for a correct method to find the gradientor *m* = −2 and *c* = 1 statedor −2*x* + 1 or *L* = $–$2*x* + 1oe |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Total 2 marks** |

| 10 | a | e.g.12*x* = 36 or 24*y* = −60 |  | 3 | M1 | for addition of given equations **or** a complete method to eliminate *y* or *x* (condone one arithmetic error) |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | e.g. 7 ”3”+ 2y = 16 or7*x* + 2 ×−2.5 = 16 |  |  | M1  | (dep) for method to find second variable |
|  |  |  | *x =* 3 oe, *y* = −2.5 |  | A1  | dep on M1 for both values correct. NB. Candidates showing no working score zero |
|  | b | *k*2 + 9*k* – 5*k* − 45 |  | 2 | M1 | for 3 terms correct **or** all 4 terms correct ignoring signs **or** *y*2 + 4*k* +….. **or**… + 4*k* − 45 |
|  |  |  | *k*2 + 4*k* − 45 |  | A1 |  |
|  |  |  |  |  |  | **Total 5 marks** |

| 11 | (a) |  | Correct probabilities | 2 | B1B1 | For 0.4 on LH branchFor 0.3, 0.7 and 0.3 on RH branches |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) |  | 0.42 | 2 | M1A1 | For 0.6 × 0.7oe |
|  | (c) | 0.6 × "0.3" × "0.8" + "0.4" × 0.7 × "0.8" + "0.4" × "0.3" × 0.2 (= 0.144 + 0.224 + 0.024) oe  |  | 3 | M2ft | For a complete methodM1ft for 0.6 × "0.3" × "0.8" or 0.144 or "0.4" × 0.7 × "0.8" or 0.224 or "0.4" × "0.3" × 0.2 or 0.024  |
|  |  |  | 0.392 |  | A1cao |  oe |
|  |  | Alternative method |  |  |  |  |
|  |  | 1 – [(0.6 × 0.7 × 0.2) + (0.4 × 0.3 × 0.8) + (0.6 × 0.7 × 0.8) + (0.6 × 0.3 × 0.2) + (0.4 × 0.7 × 0.2)] |  |  | M2ft | For complete methodM1ft for 1 – (at least 2 correct products). |
|  |  |  | 0.392 |  | A1cao |  |
|  |  |  |  |  |  | **Total 7 marks** |

| 12 | (a) |   |  | 3 | M1 | Allow *Pq*² = *k* or Do not allow  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |   oe or *k* = 12.8 × 2² or *k* = 51.2 |  |  | M1 | For correct substitution in a correct equation. Implies first M1Award M2 if *k* = 51.2 stated unambiguously  |
|  |  |  |  |  | A1 | Award 3 marks if answer is but *k* is evaluated in (a) or (b)SCB2 for *Pq*² = 51.2 or  |
|  | (b) | $\frac{51.2}{8²}$ | 0.8 | 1 | B1ft | ft equation in the form  oe  |
|  |  |  |  |  |  | **Total 4 marks** |

| 13 | (a) |  |  | 2 | M1 | For selecting 10*x* = 3.2424.... and 1000*x* = 324.2424... oe |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | show |  | A1 |   |
|  | (b) | e.g.    |   | 3 | M1M1A1 | For multiplying the numerator and denominator by (7 +  )For a correct single fraction with brackets expanded in denominatordep on correct working seen |
|  |  |  |  |  |  | **Total 5 marks** |

| 14 | (a) | e.g. or 1.6 or or 0.625 or e.g. 4 × or 4 ÷  oe ore.g. or oe |  | 2 | M1 | For correct scale factor or correct expression for *AZ* orfor a correct equation involving *AZ*oe |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 6.4 |  | A1 | oe e.g.  |
|  | (b) | Eg  or  or oe | 3.75 | 2 | M1A1  | Correct expression for *BC*oe |
|  | (c) |  |  | 3 | M2 | For a fully correct method or M1 for or 20.5 |
|  |  |  | 31.98 |  | A1 | Accept 32.0 or 32 |
|  |  |  |  |  |  | **Total 7 marks** |

| 15 | (a) |  | (*y* $–$ 8)(*y* + 6) | 2 | M1A1 | For (*y* ± 8)(*y* ± 6)cao |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | 4 = 5(*e* $–$ 3) or 4 = 5*e* $–$ 15 or  = *e* $–$ 3 |  |  | M1 |  |
|  |  |  |  | 2 | A1 | 3$\frac{4}{5}$ or 3.8 |
|  | (c) | or  |  | 3 | M1 | oe e.g.  |
|  |  | oe |  |  | M1 |  |
|  |  |  |  |  | A1 | oe e.g.  |
|  |  |  |  |  |  | **Total 7 marks** |

| 16 | (a) |   or 40  |  | 2 | M1 |  Or bar of height 40 wrong width |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Correct bar |  | A1 |  |
|  | (b) |  | 5 | 1 | B1 |  |
|  |  |  |  |  |  | **Total 3 marks** |

| 17 | (a) | 0.5 × (360 $–$ 260) or 0.5 × 100  | 50 |  2 | M1A1 | For a complete method |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | e.g. 360 $–$ (“50” + 260 + 30) (= 20), 90 $–$ "20"or  |  | 2 | M1ft | For a complete method. |
|  |  |  | 70 |  | A1 |  |
|  |  |  |  |  |  | **Total 4 marks** |

| 18 | (a) |  | $–$3.4 | 2 | M1A1 | Line *y* = $–$5 drawn or clear attempt to take reading at y = $–$5Accept $–$3.35 to $–$3.45 inclusive |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) |  |  | 3 | M2 | *y* = $–$ 5*x* drawn.M1 for *x*³ $–$ 0.2*x*² $–$ 9*x* + 7 = $–$5*x* or *y* = $–$5*x* oe |
|  |  |  | $–$2.5 |  | A1 | dep on at least M1 (−2.45 - −2.55) |
|  |  |  |  |  |  | **Total 5 marks** |

| 19 |  | ($π$ × 5²) + $π$ × 5 × *l* (25$π$) + 5$π$*l* |  | 5 | M1 | For a correct expression for total surface area |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | (*l* =) 13 |  |  | A1 | For the correct slant height |
|  |  | (*h* = )  |  |  | M1 | For the correct method to find *h*ft if first M1 scored |
|  |  | (= 314 - 314.3) |  |  | M1 | For the correct method to find *V*ft if first M1 scored |
|  |  |  | $$100π$$ |  | A1 |  |
|  |  |  |  |  |  | **Total 5 marks** |

| 20 | (a) | 6$\sqrt{c}$ $–$ 9 +2*c* $–$ 3$\sqrt{c}$ or 3$\sqrt{c}$ $–$ 9 +2*c*  |  | 3 | M1 | Accept $\sqrt{c}\sqrt{c}$ or $(\sqrt{c} )^{2}$ instead of *c* |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | *c* = 5*k* = 3 |  | A1B1 |  |
|  | (b) |  or  |  | 3 | M1 |  |
|  |  |  |  |  | M1 |  |
|  |  |  |  |  | A1 | gains M2 only |
|  |  |  |  |  |  | **Total 6 marks** |

| 21 | (a) |  | 3*x* $–$ 13 $–$ 50 | 1 | B1 | or 3*x* – 13 – 25 − 25 |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | *x* $–$ 52  |  | 5 | B1 | or *x* – 2 – 25 × 2 |
|  |  | 25(3*x* $–$ 63)(*x* $–$ 52) (= 81900) |  |  | M1 | For a correct expression for volume of box |
|  |  | eg 3*x*² $–$ 156*x* $–$ 63*x* + 3276 (= 3276)or 75*x*² $–$ 3900*x* $–$ 1575*x* +81900 (= 81900) |  |  | M1 | For brackets correctly expanded |
|  |  | eg 3*x*² $–$ 219*x* = 0 or 3*x*(*x* $–$ 73) = 0or 75*x*² $–$ 5475*x* = 0 |  |  | M1 | For correctly reducing to 2 term quadratic equation  |
|  |  | (*x* = 0) or *x* = 73 | 73 |  | A1 | For *x* = 73NB: A1 dependent on at least 2 method marks |
|  |  |  |  |  |  | **Total 6 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question** | **Working** | **Answer** | **Mark** | **AO** | **Notes** |
| **22** |  | *a* + 3*d* = 17 or *a* + 9*d* = 35 or |  |  | AO1 | M1 |  | M1 for 17 = 4*p* + *q* **and** 35 = 10*p* + *q* |
|  |  | 35 – 17 = 6*d* |  |  |  | A1 |  | *p* = 3 and *q* = 5 |
|  |  | *d* = 3 |  |  |  | A1 | ft from *d* = 3 | *u*1 = 8 and *u*50 = 155 |
|  |  | *a = 8* |  |  |  | M1 |  |  × 50(8 + 155) |
|  |  |  (2 × '8' + (50 − 1) '3') oe | 4075 | 5 |  | A1 |  |