**IGCSE (9–1) Maths - practice paper 3F mark scheme**

**Results Plus data on 94 of the 100 marks:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Paper 3** |  |  |  |  | **Edexcel averages:** |
| **Year** | **Paper** | **Qu. no** | **New qu. no.** | **Mean score** | **Max score** | **Mean %** |  | **ALL** | **A\*** | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **U** |
| 1706 | 1FR | Q01 | Q01 | 3.24 | 5 | 64.8 |  | 3.24 |  |  |  | 4.34 | 3.35 | 2.69 | 2.27 | 1.53 | 0.61 |
| 1706 | 1FR | Q02 | Q02 | 4.96 | 6 | 82.7 |  | 4.96 |  |  |  | 5.79 | 5.42 | 4.99 | 3.97 | 2.78 | 1.15 |
| 1706 | 1FR | Q03 | Q03 | 1.99 | 3 | 66.3 |  | 1.99 |  |  |  | 2.64 | 2.00 | 1.70 | 1.48 | 0.96 | 0.31 |
| 1706 | 1FR | Q05 | Q04 | 1.86 | 3 | 62.0 |  | 1.86 |  |  |  | 2.52 | 1.99 | 1.74 | 1.25 | 0.38 | 0.08 |
| 1706 | 1FR | Q06 | Q05 | 2.11 | 3 | 70.3 |  | 2.11 |  |  |  | 2.50 | 2.26 | 2.02 | 1.74 | 1.22 | 0.39 |
| 1706 | 1FR | Q08 | Q06 | 2.90 | 4 | 72.5 |  | 2.90 |  |  |  | 3.41 | 3.16 | 2.78 | 2.68 | 1.15 | 0.61 |
| 1706 | 1FR | Q09 | Q07 | 2.40 | 4 | 60.0 |  | 2.40 |  |  |  | 3.38 | 2.65 | 2.13 | 1.22 | 0.54 | 0.08 |
| 1706 | 1FR | Q10 | Q08 | 2.92 | 6 | 48.7 |  | 2.92 |  |  |  | 5.08 | 3.06 | 1.51 | 0.61 | 0.39 | 0.08 |
| 1706 | 1FR | Q13 | Q09 | 3.59 | 4 | 89.8 |  | 3.59 |  |  |  | 3.90 | 3.74 | 3.80 | 3.26 | 2.79 | 0.69 |
| 1706 | 1FR | Q14 | Q10 | 1.78 | 3 | 59.3 |  | 1.78 |  |  |  | 2.67 | 2.08 | 1.30 | 0.68 | 0.32 | 0.15 |
| 1706 | 1FR | Q15 | Q11 | 1.70 | 4 | 42.5 |  | 1.70 |  |  |  | 2.90 | 1.59 | 1.04 | 0.60 | 0.21 | 0.23 |
| 1706 | 1FR | Q17 | Q12 | 1.37 | 3 | 45.7 |  | 1.37 |  |  |  | 2.33 | 1.52 | 0.74 | 0.31 | 0.09 | 0.00 |
| 1706 | 1FR | Q19 | Q13 | 4.24 | 8 | 53.0 |  | 4.24 |  |  |  | 6.56 | 4.30 | 2.98 | 2.03 | 1.11 | 0.08 |
| 1706 | 1FR | Q20 | Q14 | 1.61 | 4 | 40.3 |  | 1.61 |  |  |  | 2.93 | 1.46 | 0.87 | 0.36 | 0.17 | 0.00 |
| 1706 | 1FR | Q21 | Q15 | 1.62 | 6 | 27.0 |  | 1.62 |  |  |  | 3.46 | 1.00 | 0.61 | 0.14 | 0.17 | 0.08 |
| 1706 | 1FR | Q22 | Q16 | 1.45 | 3 | 48.3 |  | 1.45 |  |  |  | 2.24 | 1.47 | 1.23 | 0.51 | 0.23 | 0.23 |
| Sp ppr | 1F | Q16 | Q17 |  | 3 |  |  |  |  |  |  |  |  |  |  |  |  |
| 1701 | 2FR | Q21 | Q18 | 1.98 | 3 | 66.0 |  | 1.98 |  |  |  | 2.76 | 1.29 | 1.11 | 0.50 | 0.50 | 0.00 |
| 1606 | 1FR | Q24 | Q19 | 0.53 | 2 | 26.5 |  | 0.53 |  |  |  | 0.85 | 0.38 | 0.46 | 0.19 | 0.29 | 0.00 |
| 1706 | 3HR | Q08 | Q20ab | 2.09 | 3 | 69.7 |  | 2.09 | 2.78 | 2.45 | 1.97 | 1.38 | 0.67 | 0.21 |  |  | 0.16 |
| 1506 | 3HR | Q05c | Q20c | 1.44 | 2 | 72.0 |  | 1.44 | 1.84 | 1.48 | 1.20 | 0.82 | 0.30 | 0.06 |  |  | 0.00 |
| 1706 | 3HR | Q9 | Q21 | 2.98 | 4 | 74.5 |  | 2.98 | 3.81 | 3.46 | 2.87 | 2.09 | 1.21 | 0.52 |  |  | 0.29 |
| 1701 | 3HR | Q13 | Q22 | 2.54 | 3 | 84.7 |  | 2.54 | 2.89 | 2.59 | 2.47 | 2.15 | 1.73 | 0.84 |  |  | 0.44 |
| 1706 | 2FR | Q23a | Q23 | 0.94 | 2 | 47.0 |  | 0.94 |  |  |  | 1.53 | 0.92 | 0.62 | 0.06 | 0.00 | 0.00 |
| Sp ppr | 2F | Q21 | Q24 |  | 3 |  |  |  |  |  |  |  |  |  |  |  |  |
| 1706 | 1FR | Q25 | Q25 | 2.58 | 6 | 43.0 |  | 2.58 |  |  |  | 4.16 | 2.84 | 1.64 | 0.71 | 0.51 | 0.23 |
|  |  |  |  | **54.82** | **94** | **58.3** |  | **54.82** |  |  |  | **72.39** | **50.39** | **37.59** | **24.57** | **15.34** | **5.89** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Ques** | **Working** | **Answer** | **Mark** |  | **Notes** |
| **1**a |  | 8.8 | 1 | B1 |  |
| b |  | Correct place | 1 | B1 |  |
| c |  | 6 | 1 | B1 |  |
| d | (1.4 + 4.8) ÷ 2 or(4.8 - 1.4) ÷ 2 (=1.7) and '1.7' + 1.4 | 3.1 | 2 | M1 | for a method to find the half way value |
|  |  |  |  | A1 |  |
|  |  |  |  |  | **Total 5 marks**  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **2a** |  | 10 | 1 | B1 |  |
| b |  | 30 | 1 | B1 |  |
| c |  | 40 | 1 | B1 |  |
| d |  | 0.6(0) | 1 | B1 |  |
| e |  |  | 2 | M1 oe |  |
|  |  |  |  | A1 |  |
|  |  |  |  |  | **Total 6 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **3a** |  | × at 0.5 | 1 | B1 |  |
| b |  | × at  | 1 | B1 |  |
| c |  | × at 0 | 1 | B1 |  |
|  |  |  |  |  | **Total 3 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **4a** |  | Obtuse | 1 | B1 |  |
| b |  | 60 | 1 | B1 |  |
| c |  | Trapezium | 1 | B1 |  |
|  |  |  |  |  |  |
|  |  |  |  |  | **Total 3 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **5a** |  | 9 | 1 | B1 |  |
| b |  | 21 | 1 | B1 |  |
| c |  | Explanation | 1 | B1 | e.g all the terms are odd and 150 is even **or** 149 is in the sequence **or** 4*n* + 1 = 150 does not have an integer answer |
|  |  |  |  |  |  |
|  |  |  |  |  | **Total 3 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **6a** |  | (−3, −2) | 1 | B1 |  |
| b |  | Plotted | 1 | B1 |  |
| c |  | Suitable point | 2 | B2 | for e.g (3, −2), (−3, 4)(B1 for *C* plotted correctly but coordinates written incorrectly) |
|  |  |  |  |  |  |
|  |  |  |  |  | **Total 4 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **7a** |  | 24 | 1 | B1 |  |
| bi |  |  | 3 | B1 |  |
| ii | 28, 32, 36, 38, 40, 45, **or**  |  |  | M1 | ft from (a) |
|  |  |  |  | A1 | ft from (a) |
|  |  |  |  |  | **Total 4 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **8a** |  | 36 | 3 | M1 |  |
|  |  oe |  |  | M1 |  |
|  |  |  |  | A1 |  |
| b | 5400 ÷ 360 (= 15) **or**  **or** 360 ÷ 40 (=9) | 600 | 3 | M1 |  |
|  | ‘15 ‘ × 40 **or**  **or** 5400 ÷ “9” |  |  | M1 |  |
|  |  |  |  | A1 |  |
|  |  |  |  |  | **Total 6 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **9** | 34.00 + 9.20 + 12.20 + 39.00 + 8.75 + 9.50 (= 112.65) | 7.35 | 4 | M1 | adding at least 5 correct prices |
|  | 70 + 50 (= 120) |  |  | M1 |  |
|  | '120' −'112.65' |  |  | M1 | (dep M1,M1) |
|  |  |  |  | A1 |  |
|  |  |  |  |  | **Total 4 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **10a** |  | 3 | 1 | B1 |  |
| b |  | 5 |  | M1 | or for 8 × 2*t* **or** 80 ÷ 8 **or** 80 ÷ 2 |
|  |  |  |  | A1 |  |
|  |  |  |  |  | **Total 3 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **11a** |  | 17 or 19 | 1 | B1 | for either or both |
| b |  | 2, 23 | 1 | B1 |  |
| c  | (60 − 2) ÷ 2 | 29, 31 | 2 | M1 | any complete method |
|  |  |  |  | A1 |  |
|  |  |  |  |  | **Total 4 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **12** | 5*x* – *x* = 8 – 10 |  |  | M1 | for correct rearrangement with *x* terms on one side and numbers on the other in a correct equation **or**the correct simplification of either *x* terms or numbers on one side in a correct equationeg. 4*x* − 8 = −10 ; 5*x* = *x* – 2 |
|  | 4*x*  = −2 |  |  | M1 | or –4*x* = 2 **or** 4*x* + 2 = 0  **or** −4*x* – 2 = 0NB: This mark implies the previous M1 |
|  |  | −0.5 | 3 | A1 | oe e.g.  dep on M1 |
|  |  |  |  |  | **Total 3 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **13a** | 3500 ÷ 119  |  |  | M1 |  |
|  |  | 29.41 | 2 | A1 | for 29.41 – 29.412 |
| b | 8500 ÷ 52 **or** 163(.461..) |  |  | M1 |  | M1 for 8500 × 119 =1011500 | M1 for 119 ÷ 52 (=2.28…) |
|  | “163.461.”.× 119 |  |  | M1 | dep | M1 for “1011500” ÷ 52 | M1 for 8500 × “2.28…” |
|  |  | 19452 | 3 | A1 | for 19380 – 19520 |
| c | 24 ÷ 60 (=0.4) **or** 2.4 **or** oe **or** 2 × 60 + 24 (=144)  |  |  | M1 |  |
|  | 1534 ÷ 2.4 oe **or**(1534 ÷ 144) × 60 oe |  |  | M1 |  (allow 1534 ÷ 2.24 **or** answer of 684(.82…) or 685) |
|  |  | 639 | 3 | A1 | for 639 – 639.17 |
|  |  |  |  |  | **Total 8 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **14a** | π × 2.5 oe **or** 2 × *π* ×   |  |  | M1 |  |
|  |  | 7.85 | 2 | A1 | 7.85 – 7.86 |
| b |  oe **or** oe |  |  | M1 | or for digits 188 |
|  |  | 18.8 | 2 | A1 | accept 19 if 18.8 seen |
|  |  |  |  |  | **Total 4 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **15a** |  **or**  **or** 3 × 21(=63) **or** 2 × 19(=38) |  |  | M1 |   |
|  | 3 × 21 − 2 × 19 |  |  | M1 | for a complete method |
|  |  | 25 | 3 | A1 |  |
| **b** | 2 ×19 − 20 (=18) **or**21×3 – 20 – “25” (=18) |  |  | M1 | ft from (a) for a complete method to find age of 3rd person  |
|  | “25” – “18” |  |  | M1 | dep or for 18 – 25  |
|  |  | 7 | 3 | A1 | ft from answer in (a)  |
|  |  |  |  |  | **Total 6 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **16** | e.g. 2 × 2 × 7 × 12 **or**at least 3 divisions in a factor tree |  |  | M1 | for the start of a correct method e.g. may be a factor tree **or** consecutive divisionscondone 1 error |
|  | All 6 correct prime factors, no extras (2,2,2,2,3,7,(1)) |  |  | M1 | e.g. from a factor tree, ignore 1s |
|  |  | 2×2×2×2×3×7 | 3 | A1 | oe dep on M1, M1 |
|  |  |  |  |  | **Total 3 marks** |

| 17 |  | 120 ÷ 1002 (=0.012) or 810 ÷ 120 (=6.75) |  |  | M1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | 810 ÷ “0.012” or “6.75” × 1002 |  |  | M1 |  |
|  |  |  | 67 500 | 3 | A1 |  |
|  |  |  |  |  |  | **Total 3 marks** |

| 18 |  | 12.8² $–$ 9.7² or 163.84 $–$ 94.09 or 69.75  |  | 3 | M1 | For squaring and subtracting[ **and**  ]  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | M1dep  | For square root [ ] |
|  |  |  | 8.35 |  | A1 | Allow 8.35 - 8.352 |
|  |  |  |  |  |  | **Total 3 marks** |

| **Q** | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| **19** |  |  or  | 45 | 2 | M1A1  | For complete correct method for exterior angleDo not isw interior angle found |
|  |  |  |  |  |  | **Total 2 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **20a** |  | 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 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **c** |  | Vertices at (3, 2) (3, 4) (4, 4) (4, 3) | 2 | B2 If not B2 then B1 for shape of correct size and orientation **OR** a correct enlargement scale factor  , centre (1, 3) |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **Total 5 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **21a** |  |  | 2 | B2 | If not B2 then award B1 for *a*, *b* ≠ 0 |
| b |  | (*x* − 6)(*x* + 1) | 2 | B2 | If not B2 then award B1 for  (*x* – 1)(*x* + 6) **or** (*x* – 3)(*x* – 2) **or** (*x* + 3)(*x* – 2) **or** (*x* – 3)(*x* + 2) |
|  |  |  |  |  | **Total 4 marks** |

| 22 | a |  | 0.00079 | 1 | B1 | cao |
| --- | --- | --- | --- | --- | --- | --- |
|  | b |  |  | 2 | M1 | for 20.15 × 109 **or** 20 150 000 000 or 2.015 × 10*n* where *n* ≠ 10 |
|  |  |  | 2.015 × 1010 |  | A1 | For 2 × 1010 or better |
|  |  |  |  |  |  | **Total 3 marks** |

| 23 |  | 4*x* ≥ 27 – 13 or  or –4*x* ≤ 13 – 27 or  |    | 2 | M1A1 | Accept an equation in place of an inequality orAccept wrong inequality sign orAccept 3.5 oe given as answeroeMust be the final answer |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Total 2 marks** |

| 24 |  | Eg 14*x* = −7, 14*y* = 77, 6*x* + 4(3 – 5*x*) = 19 | *x* = −0.5, *y* = 5.5 | 3 | M1M1 A1 | For correctly eliminating 1 variableOne value correct dep on M1Both values dep on M1 |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Total 3 marks** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **25a** | 100 − 9.4 (= 90.6) |  |  |  | M1 |  |
|  |  oe | 607 – “57.058” |  |  | M1 |  (dep) |
|  |  | 550 | 3 | A1 | for 549.942 **or** 549.94 **or**  549.9 |
| b | oe |  |  | M2 | for a complete methodIf not M2 then award M1 for a correct first step1320 ÷ 20 (=66) **or** 0.2*x* = 1320 **or**1320 ÷ 2 (=660) |
|  |  | 6600 | 3 | A1 |  |
|  |  |  |  |  | **Total 6 marks** |