| Question | **Working** | **Answer** | **Marks** | **Notes** |
| --- | --- | --- | --- | --- |
| 1 |  |  |  | 1 | B1 |  |
| 2 |  |  | 46800 | 1 | B1 |  |
| 3 |  |  | 73.7 | 1 | B1 |  |
| 4 |  |  | 9 | 1 | B1 |  |
| 5 |  |  |  | 1 | B1 |  |
| 6 |  |  **or**  **or**   **or**  **or** 8 × 8 = 64 **or** 4 × 4 × 4 = 64**or** 1, 4, 9, 16, 25, 36, 49, 64 **or** 1, 8, 27, 64 |  | 2 | M1 |  |
|  |  |  |  and  |  | A1 | or  and  or correct list of square & cube numbers to 64 |
| 7 |  |  | 1331 | 1 | B1 |  |
| 8 |  |  | 9.9 | 1 | B1 |  |
| 9 |  | 3.80 ÷ 4 (=0.95) **or** 0.75 × 3.80 oe (=2.85) | 2.24 |  | M1 |  |
|  |  | 7.33 – 3 × “0.95” (=4.48) **or** 7.33 – “2.85” (=4.48) |  |  | M1 |  |
|  |  | “4.48” ÷ 2 |  |  | M1 |  |
| 10 |  | 400 and 1300 or 900 |  | 3 | M1 | read scales correctly **or** 1300 × 0.4 (=520) **or** 400 × 0.4 (=160) **or** 9 × 0.4 (=3.6) **or** (*x* – *y*) × 0.4 where *x* and *y* are readings and *x* = 1300 or *y* = 400 |
|  |  | **or** “520” – “160” |  |  | M1 | Difference of both correct readings × 0.4 oe |
|  |  |  | 360 |  | A1 | cao |
| 11 | (a)  | 4.3333(3…) + 0.37894(7…) **or**   |  | 2 | M1 | Evaluate either fraction correctly as a decimal to at least 5SF(rounded or truncated) or as a simplified fraction or an answer of 4.71(2) |
|  |   |  | 4.7122(80702) |  | A1 | Correct to at least 5SF (rounded or truncated). |
|  | (b) |  | 4.71 | 1 | B1 | ft if at least 4SF given in (a)(not )  |
| 12 | (a) |  | correct pattern | 1 | B1 | 5 dots × 5 dots open square |
|  | (b) |  | 16, 20 | 1 | B1 |  |
|  | (c) | eg 4 × 13 **or** 14 + 14 + 12 + 12 **or** 12 × 4 + 4 **or** 24, 28, 32, 36, 40, 44, 48, 52 **or** a fully correct diagram |  | 2 | M1 | allow 1 arithmetical error in continuing the sequence to 13 terms |
|  |  |  | 52 |  | A1 |  |
|  | (d) |  | 4*n* | 1 | B1 | oe eg *n* + *n* + *n* + *n* or 4 + (*n* – 1)4 |
|  | (e) | 90 ÷ 4 (= 22.5) or 88 |  | 2 | M1 | or continuing the sequence to 88 or 92 with just one error |
|  |  |  | 22 |  | A1 |  |
| 13 | a |  | 0 < *p* ≤ 1 | 1 | B1 |  |
|  | b | 0.5 × 19 + 1.5 × 12 + 2.5 × 5 + 3.5 × 2 + 4.5 × 2 (=56) **or**9.5 + 18 + 12.5 + 7 + 9 (=56) | 1.4 | 4 | M2 | for at least 4 correct products added (need not be evaluated)If not M2 then awardM1 for consistent use of value within interval (including end points) for at least 4 products which must be added **OR**correct mid-points used for at least 4 products and not added  |
|  |  | “56” ÷ 40 |  |  | M1 | dep on at least M1Allow division by their  provided addition or total under column seen |
|  |  |  |  |  | A1 | for 1.4 or   |
| 14 |  | (angle *EAD* or *ADE* or *AED =*) 60 | 123 | 5 | B1 | may be seen on diagram |
|  |  | (angle *BCD* =) 180 – 108 (=72) |  |  | M1 | may be seen on diagram |

|  |  | (angle *BAD =*)360 – (135 + “72” + 90) (=63) **or** (angle *BAD =*)360 – 297 (=63) **or**(angle *EAB* =) 123 |  |  | M1 | may be seen on diagram |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | B1 | (dep on M1) for at least **one** correct reason **reason 1** :Angles on straight line add up to 180o **or** Angles on straight line add up to 180o**reason** 2 :Angles in a quadrilateral (accept 4-sided shape) add up to 360o **or** Angles in a quadrilateral (accept 4-sided shape) add up to 360o |
|  |  |  |  |  | A1 | for 123 and full reasons |
| 15 | (a)  |  |  | 2 | M1 | for numerator of 36 + 33(= 69) **or** denominator of 135 |
|  |  |  |  |  | A1 | Accept 0.51(11...) **or** 51.(11...)%2 sf or better |
|  | (b)  |  **or** 360 ÷ 5 **or** 27 ×  oe  |  | 2 | M1 | allow use of =2.666... to 1 dp truncated or rounded |
|  |  |  | 72 |  | A1 | cao |
| 16 | (a)  | 25 – 4 × − 3 **or** 25 − − 12 **or** 25 + 12 |  | 2 | M1 | Correct substitution |
|  |   |  | 37 |  | A1 |  |
|  | (b) | 2*x*² + *x* |  | 3 | M1 |  |
|  |  | (+)3*x* − 6 |  |  | M1 | indep |
|  |  |  | 2*x*² + 4*x* + 1 |  | A1 | Cao |
| **17** |  | 32 ÷ 5 (= 6.4 or 6) **or** 15 ÷ 5 (=3) **or** 30 ÷ 5 (=6) | No with 108 | 3 | M1 |  |
|  |  | “6” × “3” × “6” (=108) |  |  | M1 | integer values must be used |
|  |  |  |  |  | A1 | SC: If no marks awarded thenaward B1 for an answer of ‘yes’ with 115(.2) **OR**‘yes’ and 14400 and 13750 |
| 18 |   |  (=230) **or** **or**  **or**  |  | 3 | M1 |  |
|  |  | (7 – 2) × “230” **or** 7 × “230” – 2 × “230” **or** “1610” – “460” **or**   |  |  | M1 | dep |
|  |  |  | 1150 |  | A1 |  |
| 19 |  |  (=1600) |  | 4 | M1 |  |
|  |  | (=21600)  **or**(20 000 – 19200) + (=2400) |  |  | M1 | Award M2 foror21600 |
|  |  |  **or** **or** “21600” ÷ 19200 (×100) oe |  |  | M1 | or for 1.125 or  or 112.5% |
|  |  |  | 12.5 |  | A1  | oe |
| **20** |  | 170 ÷ 2 (=85) **or** 170 ÷ 2 × 7 (=595) **or** 7 ÷ 2 (=3.5)  | 510 | 5 | M1 |  |
|  |  | 7 × “85” + 170 (=765) **or** 9 × “85” (=765) **or**“595” + 170 (=765) **or** 170 × “3.5” + 170 (=765) |  |  | M1 | award of this mark implies the first M1 |
|  |  | “765” ÷ 3 (=255) **or**  "765" ÷ 3 × 5 (=1275)  |  |  | M1 | dep on M2 |
|  |  | “255” × 2 **or** “1275” – “765” **or**  “1275” ÷ 5 × 2 |  |  | M1 |  |
|  |  |  |  |  | A1 |  |
| 21 | (a) |  |  | 2 | M1 | Award even if part of a calculation including 1 or 2 circles |
|  |  |  | 5.63 |  | A1 | awrt 5.63 |
|  | (b) |  (=0.375) **or**  (==) **or**   **or**  **or** 0.56 ÷  oe |  | 2 | M1 | Correct scale factor (given as a fraction or a ratio) or correct equation in *r* or a correct expression for *r*.Allow 2.6666... to 1 dp rounded or truncated |
|  |  |  | 0.21 |  | A1 | Allow 21 cm oe if units shown |
| **22** |  | 9.72 + 3.52 (=106.34) | 32.4 | 4 | M1 | M1 for the use of *MN* and a correct angle (70.1… or 70.2, 19.8…) in a correct trig statementeg cos70.2=  |
|  |  |  or  (=10.3…) |  |  | M1 | M1 for a complete method to find *MN*eg *MN*=(=10.3…) |
|  |  | π × “10.3…” **or** 2 × π ×   |  |  | M1 | dep on M2 |
|  |  |  |  |  | A1 | for answer in range 32.3 – 32.41 |
| 23 |  | **or** sin 38 =    |  | 3 | M1 | Or use of tan to find horizontal side 12.6 × tan 52 or (=16.12...) **and** a correct first stage to find *x* eg*x*² = 12.6² + “16.12...”²or oeAllow correct first stage of sine rule  |
|  |  |  **or**  (=) **or** |  |  | M1 | Accept decimal correct to at least 3SFOr (*x* =) **or**(*x* = ) Allow rearranged (*x* = ) sine rule |
|  |  |  | 20.5 |  | A1 | 20.4 – 20.5 |
| 24 |  | eg 7*x* + 7*y* = 105 − 5*x* + 5*y* = 75 + 7*x* – 5*y* = 3 7*x* – 5*y* = 3  7(15 – *y*) – 5*y* = 3 **or** 7*x* – 5(15 – *x*) = 3 oe |  | 3 | M1 | Correct method to eliminate *x* or *y*: coefficients of *x* or *y* the same **and** correct operation to eliminate selected variable (condone any one arithmetic error in multiplication) **or**writing *x* or *y* in terms of the other variable and correctly substituting |
|  |  | 6.5 + *y* = 15 **or** *x* + 8.5 = 15 **or**7 × 6.5 – 5y = 3 **or** 7*x* – 5 × 8.5 = 3 |  |  | M1 | dep Correct method to find second variable using their value from a correct method to find first variable or for repeating above method to find second variable |
|  |  |  | *x* = 6.5, *y* = 8.5 |  | A1 | dep on first M1 |
| 25 | (a) | (= 4) **or**  **or** −8 seen correctly in working |  | 3 | M1 | Accept 300 + 300 + 300 + 300 **or**800, 1100, 1400, 1700, 2000 oe |
|  |  | 6 – “4” × 2 |  |  | M1 |  |
|  |  |  |  |  | A1 |  |
|  | (b) | (= 2.4 hr) **or**  (= 144 min or 2 hr 24 mins) |  | 3 | M1 |  |
|  |  | (= 80 min) **or**  (=or 1 hr 20 min) |  |  | M1 | indep |
|  |  |  | 3 hr 44 min |  | A1 |  |

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|  |  |  |  |  | **Edexcel averages:** | **Mean score of students achieving grade** |
| **Question** | **Skills tested** | **Mean score** | **Max score** | **Mean %** | **ALL** | **5** | **4** | **3** | **2** | **1** |
| Q01 | Numbers and the number system | 0.88 | 1 | 88 | 0.88 | 0.98 | 0.97 | 0.95 | 0.86 | 0.58 |
| Q02 | Numbers and the number system | 0.86 | 1 | 86 | 0.86 | 0.95 | 0.93 | 0.91 | 0.80 | 0.69 |
| Q03 | Decimals | 0.68 | 1 | 68 | 0.68 | 0.95 | 0.88 | 0.76 | 0.49 | 0.18 |
| Q04 | Percentages | 0.88 | 1 | 88 | 0.88 | 0.99 | 0.96 | 0.92 | 0.85 | 0.67 |
| Q05 | Powers and roots | 0.80 | 1 | 80 | 0.80 | 0.98 | 0.93 | 0.85 | 0.74 | 0.43 |
| Q06 | Powers and roots | 1.29 | 2 | 65 | 1.29 | 1.86 | 1.71 | 1.34 | 0.89 | 0.42 |
| Q07 | Powers and roots | 0.91 | 1 | 91 | 0.91 | 0.99 | 0.98 | 0.97 | 0.92 | 0.65 |
| Q08 | Powers and roots | 0.92 | 1 | 92 | 0.92 | 1.00 | 0.99 | 0.98 | 0.90 | 0.71 |
| Q09 | Applying number | 2.74 | 4 | 69 | 2.74 | 3.79 | 3.46 | 3.02 | 2.10 | 1.12 |
| Q10 | Measures | 2.12 | 3 | 71 | 2.12 | 2.81 | 2.49 | 2.23 | 1.80 | 1.09 |
| Q11a | Electronic calculators | 1.44 | 2 | 72 | 1.44 | 1.86 | 1.76 | 1.52 | 1.19 | 0.68 |
| Q11b | Degree of accuracy | 0.50 | 1 | 50 | 0.50 | 0.82 | 0.69 | 0.51 | 0.31 | 0.12 |
| Q12a | Sequences | 0.82 | 1 | 82 | 0.82 | 0.92 | 0.88 | 0.84 | 0.78 | 0.64 |
| Q12b | Sequences | 0.95 | 1 | 95 | 0.95 | 0.97 | 0.98 | 0.97 | 0.93 | 0.90 |
| Q12c | Sequences | 1.79 | 2 | 90 | 1.79 | 1.92 | 1.90 | 1.85 | 1.78 | 1.51 |
| Q12d | Sequences | 0.37 | 1 | 37 | 0.37 | 0.72 | 0.52 | 0.33 | 0.19 | 0.08 |
| Q12e | Powers and roots | 1.00 | 2 | 50 | 1.00 | 1.49 | 1.23 | 1.07 | 0.75 | 0.33 |
| Q13a | Statistical measures | 0.52 | 1 | 52 | 0.52 | 0.91 | 0.75 | 0.51 | 0.25 | 0.10 |
| Q13b | Statistical measures | 1.48 | 4 | 37 | 1.48 | 3.23 | 2.37 | 1.29 | 0.45 | 0.05 |
| Q14 | Angles, lines and triangles | 2.09 | 5 | 42 | 2.09 | 3.71 | 3.00 | 2.19 | 1.04 | 0.26 |
| Q15a | Probability | 1.39 | 2 | 70 | 1.39 | 1.85 | 1.74 | 1.52 | 1.09 | 0.46 |
| Q15b | Statistical measures | 0.77 | 2 | 39 | 0.77 | 1.66 | 1.17 | 0.67 | 0.23 | 0.03 |
| Q16a | Expressions and formulae | 1.20 | 2 | 60 | 1.20 | 1.75 | 1.58 | 1.30 | 0.86 | 0.24 |
| Q16b | Algebraic manipulation | 1.28 | 3 | 43 | 1.28 | 2.40 | 1.82 | 1.22 | 0.63 | 0.18 |
| Q17 | 3D shapes and volume | 0.84 | 3 | 28 | 0.84 | 1.07 | 1.09 | 1.00 | 0.63 | 0.26 |
| Q18 | Ratio and proportion | 1.75 | 3 | 58 | 1.75 | 2.86 | 2.55 | 1.82 | 0.91 | 0.21 |
| Q19 | Percentages | 2.09 | 4 | 52 | 2.09 | 3.46 | 2.93 | 2.33 | 1.02 | 0.15 |
| Q20 | Ratio and proportion | 1.85 | 5 | 37 | 1.85 | 3.41 | 2.65 | 1.87 | 0.89 | 0.31 |
| Q21a | 3D shapes and volume | 1.05 | 2 | 53 | 1.05 | 1.68 | 1.54 | 1.13 | 0.51 | 0.09 |
| Q21b | Similarity | 0.36 | 2 | 18 | 0.36 | 1.12 | 0.56 | 0.18 | 0.04 | 0.00 |
| Q22 | Pythagoras' Theorem | 1.04 | 4 | 26 | 1.04 | 2.93 | 1.67 | 0.71 | 0.13 | 0.04 |
| Q23 | Trigonometry | 0.58 | 3 | 19 | 0.58 | 1.73 | 0.93 | 0.30 | 0.08 | 0.01 |
| Q24 | Simultaneous linear equations | 0.54 | 3 | 18 | 0.54 | 1.86 | 0.81 | 0.21 | 0.08 | 0.01 |
| Q25a | Applying number | 1.49 | 3 | 50 | 1.49 | 2.16 | 1.77 | 1.60 | 1.15 | 0.61 |
| Q25b | Measures | 1.13 | 3 | 38 | 1.13 | 1.97 | 1.54 | 1.15 | 0.63 | 0.18 |
|  |  | **40.40** | **80** | **51** | **40.40** | **63.76** | **52.73** | **41.02** | **26.90** | **13.99** |

**Suggested Grade Boundaries based on peformance of students in Summer 2018**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **5** | **4** | **3** | **2** | **1** |
| 58 | 47 | 34 | 20 | 13 |