| 1 |  | oe eg oe |  |  | M1 | or oe |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | (*x* =) oe eg (*x* =) |  |  | M1 | or oe |
|  |  |  | 35.9 | 3 | A1 | accept 35.7 - 36.1 |
|  |  |  |  |  |  | **Total 3 marks** |

| 2 | a | 1.04 × 3 130 000 oe | |  |  | M2 | complete method to increase salary by 4%  M1 for 0.04 × 3 130 000 oe  (= 125 200) | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | | 3 255 200 | 3 | A1 |  | |
|  | b | for 0.15 × 750 000 oe (=112 500) **or** 0.85 × 750 000 oe (=637 500) | **OR** 750 000 × 0.853 |  |  | M1 | For method to find depreciation for 1 year or value after 1 year | **or** M2 for 750 000 × 0.853 (= 460 593.75)  **or** 750 000 × 0.854  (= 391 504.69)  (M1 for 750 000 × 0.852 (= 541 875) |
|  |  | 0.85 × “637 500” oe (= 541 875) 0.85 × “541 875” oe(= 460 593.75) |  |  | M1 | for completing method |
|  |  |  | | 460 594 | 3 | A1 | accept 460 593 – 460 594 | |
|  |  |  | |  |  |  | **SC:** if no other marks gained award M1 for  0.55 × 750 000 oe **(=** 412 500) **or**  0.45 × 750 000 oe **(=** 337 500)  accept (1 – 0.15) as equivalent to 0.85 throughout | |
|  |  |  | |  |  |  | **Total 6 marks** | |

| 3 | a |  | 50 < *L* ≤ 60 | 1 | B1 | oe eg 50 - 60 |
| --- | --- | --- | --- | --- | --- | --- |
|  | b | 25 × 6 + 35 × 26 + 45 × 31 + 55 × 40 + 65 × 17  (150 + 910 + 1395 + 2200 + 1105)(= 5760) |  |  | M2 | For correct products using midpoints (allow one error) with intention to add. M1 for products using frequency and a consistent value within the range (allow one error) with intention to add or correct products using midpoints (allow one error) without addition |
|  |  | “5760” ÷ “120” |  |  | M1 | dep on M1 |
|  |  |  | 48 | 4 | A1 |  |
|  |  |  |  |  |  | **Total 5 marks** |

| 4 |  | E.g. 1 − 0.2 (= 0.8) **or**  100(%) − 20(%) (= 80(%)) **or**  (= 13.5) oe |  | 3 | M1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | E.g. 1080 ÷ 0.8 or  1080 ÷ 80 × 100 or ‘13.5’ × 100 1080 × 100 ÷ 80 |  |  | M1 | for a complete method |
|  |  |  | 1350 |  | A1 |  |
|  |  |  |  |  |  | **Total 3 marks** |

| 5 |  | 8.52 – (8 ÷ 2)2 (= 56.25) **or** oe |  |  | M1 | **or** eg |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | (= 7.5) **or** (= 61.927...) oe |  |  | M1 | **or** eg  (other angle = 56.144...) |
|  |  | 8 × “7.5” ÷ 2 oe **or** 0.5 × 8 × 8.5 × sin “61.927...” |  |  | M1 | **or** eg 0.5 × 8.5 × 8 × sin”61.927...” oe |
|  |  |  | 30 | 4 | A1 |  |
|  |  |  |  |  |  | **Total 4 marks** |

| 6 |  | **or** *x* = 8 |  | 4 | M1 | (indep) |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | oe **or**‘66’ – 4 – 7 – 10 (= 45) |  |  | M1 | where *x* may be a number 7 < *x* < 10 |
|  |  | (*y* = ) (6 × 11 – 4 – 7 – 10 – ‘8’) ÷ 2 |  |  | M1 | ft their median provided 7 < *x* < 10 for a fully correct method |
|  |  |  | *x* = 8 and*y* = 18.5 oe |  | A1 |  |
|  |  |  |  |  |  | **Total 4 marks** |

| 7 |  | *π* × 32 × *h* = 72*π* oe |  |  | M1 | Allow use of 3.14... or for *π* and use of 226... for 72*π* |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | *h* = 72*π* ÷ (*π* × 32) oe **or** *h* = 8 |  |  | M1 | method to isolate *h* (may be seen in several stages) |
|  |  | 2 × π × 32 (= 18*π* or 56.54...) **or** 2 × *π* × 3 × “8” oe (= 48*π* or 150 - 151) |  |  | M1 | method to find the area of the two circles **or** curved surface area – use of their *h*, dep on 1st M1  (NB may get this mark for total area of 2 circles with no previous marks awarded) |
|  |  | 2 × π × 32 + 2 × *π* × 3 × “8” oe (= 66*π*) |  |  | M1 | method to find total surface area ft their *h* dep on 1st M1, including intention to add, to find the total surface area |
|  |  |  | 207 | 5 | A1 | accept 207-208 |
|  |  |  |  |  |  | **Total 5 marks** |

| 8 |  | (10 – 2) × 180 oe (= 1440) **or**(6 – 2) × 180 oe (= 720) |  | 4 | M1 | for a method to find the sum of the interior angles of a decagon or a hexagon |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | ‘1440’ – 148 – 2×150 – 2×168 – 2×134 – 2×125 (=138) **or ‘**1440’ – 1302 (= 138) **or** ‘720’ – 148÷2 – 150 – 168 – 134 – 125 (= 69) **or**  ‘720’ – 651 (= 69) |  |  | M1 | Allow omission of one angle |
|  |  | 360 – ‘138’ **or** 360 – 2 × ‘69’ |  |  | M1 |  |
|  |  |  | 222 |  | A1 |  |
|  |  |  |  |  |  |  |
|  |  | **Alternative method (exterior angles)** |  |  |  |  |
|  |  | 360 – 2×(180 – 125) – 2×(180 – 134) – 2×(180 – 168) – 2×(180 – 150) – (180 – 148)**or** 360 – 2×55 – 2×46 – 2×12 – 2×30 – 32 |  | 4 | M2 | If not M2 then award M1 for at least 3 or (180 – 125) , (180 – 134) , (180 – 168) ,  (180 – 150), (180 – 148) **or**  at least 3 of 55, 46, 12, 30, 32 |
|  |  | 180 + ‘42’ |  |  | M1 |  |
|  |  |  | 222 |  | A1 |  |
|  |  |  |  |  |  | **Total 4 marks** |

| 9 |  | 100 ÷ 28 440 (= 0.0035…) **or** 28 440 ÷ (60 × 60) (= 7.9) |  | 3 | M1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | ‘0.0035...’ × 60 × 60 **or** 100 ÷ ‘7.9’ |  |  | M1 |  |
|  |  |  | 13 |  | A1 | for 12.65 – 13 |
|  |  |  |  |  |  | **Total 3 marks** |

| 10 |  | 15 × 60 × 60 (= 54 000) oe **or**× 60 × 15 (= 4500) oe **or** 5 × × 60 (= 1500) oe |  | 4 | M1 |  | M2 for  (= 22 500) |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | ‘54000’ ÷ 12 × 5 (= 22 500) oe **or** ‘4500’ × 5 (= 22 500) oe **or**  ‘1500’ × 15 (=22 500) oe |  |  | M1 |  |
|  |  | ‘22 500’ × 0.002 oe |  |  | M1 | dep on M2 for a complete method | |
|  |  |  | 45 |  | A1 |  | |
|  |  |  |  |  |  | **Total 4 marks** | |

| 11 |  | *ADC* = 180 – 58 (= 122) **or** *EDF* = 122**or** *CDE* = 58 **or** *ADF* = 58 |  |  | M1 | may be seen marked on the diagram |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | e.g. *DEF* = 58 ÷ 2 **or***DEF* = (180 – 122) ÷ 2 |  |  | M1 | complete method to find angle *DEF* |
|  |  |  | 29 |  | A1 |  |
|  |  |  |  | 5 | B2 | dep on M2 for fully correct reasons for their method (B1 dep on M1 for one correct reason stated and used) e.g. Allied angles, co-interior angles, Alternate angles, Corresponding angles, Vertically opposite angles are equal (or Vertically opposite angles are equal), Angles on a straight line add up to 180°(or angles on a straight line add to 180°), Sum of two angles in a triangle are equal to opposite exterior angle, Angles in a triangle add up to 180°(or Angles in a triangle add up to 180°), Base angles in an isosceles triangle  Angles in a quadrilateral add up to 360. (accept “4-sided shape”or parallelogram)  Opposite angles of a parallelogram are equal |
|  |  |  |  |  |  | **Total 5 marks** |

| 12 |  | (*AX* =) (17.6 – 8.4) ÷ 2 (= 4.6) |  | 6 | M1 | where *X* is the foot of the perpendicular from *B* to *AD* |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | 0.5 × (8.4 + 17.6) × *h* = 179.4 **or** 0.5 × ‘4.6’ × *h* + 0.5 × ‘4.6’ × *h* + 8.4 × *h* = 179.4 **or** 13 × *h* = 179.4 |  |  | M1 |  |
|  |  | (*h* =) 179.4 ÷ ‘13’ (=13.8) **or** (*h* =) 358.8 ÷ ‘26’ (=13.8) oe |  |  | M1 |  |
|  |  | tan *ABX* =  **or**tan *BAX* = |  |  | M1 | ft their *h* dep on second M1    = (14.546…) **and** one from  or  oror  oror |
|  |  | (*ABX* =) tan-1 (= 18.4) **or**(*BAX* =) tan-1 (= 71.6) |  |  | M1 |  |
|  |  |  | 108.4 |  | A1 | awrt 108.4 |
|  |  |  |  |  |  | **Total 6 marks** |

| 13 | (a) | 35 ÷ 10 (=3.5), 45 ÷ 15 (=3), 75 ÷ 15 (=5), 40 ÷ 20 (=2), (8 ÷ 10) = 0.8 |  | 3 | M1 | for any two correct fd **or**  two correct bars drawn of different widths |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | 35 ÷ 10 (=3.5) **and** 45 ÷ 15 (=3) **and** 75 ÷ 15 (=5) **and** 40 ÷ 20 (=2) **and** (8 ÷ 10) = 0.8 |  |  | M1 | for all correct fd **or**  at least 3 correct bars drawn |
|  |  |  |  |  | A1 | for a fully correct histogram with ‘frequency density’ (or fd) and scale on the axis labelled or appropriate key  (SC: B2 for all five bars drawn of correct width with heights in the correct ratio)  (SC: B1 for three bars drawn of correct width with heights in the correct ratio) |
|  | (b) | 10 × 5 + 40 + 8 or × 75 + 40 + 8 |  | 2 | M1 | ft from their histogram in (a) for a correct method |
|  |  |  | 98 |  | A1 |  |
|  |  |  |  |  |  | **Total 5 marks** |

| 14 |  | oe **or**oe **or** **or**  oe |  | 3 | M1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | (=1.0175…) or (=1.0175…) |  |  | M1 |  |
|  |  |  | 1.75 |  | A1 |  |
|  |  |  |  |  |  | **Total 3 marks** |

| 15 |  | eg oe **or** oe **or** oe **or** oe (= 6.97...) **and**  oe **or** oe (=6.97...) **and** *AC*² = 6.97² − 4² oe |  |  | M1 | A correct trig statement involving *AC* **or** trig and then Pythagoras involving *AC* |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | oe eg (*AC* =) 4tan55 (= 5.71...) **or**  **or** “6.97” × cos35 oe **or** (*AC* =) |  |  | M1 | complete method to find *AC* |
|  |  | (*BC* =)  (= 2.76...) |  |  | M1 | complete method to find *BC* |
|  |  | 4 × 5 × “2.76...” |  |  | M1 | method to find volume |
|  |  |  | 55.3 | 5 | A1 | accept 55.1 – 55.5 |
|  |  |  |  |  |  | **Total 5 marks** |

| 16 |  | eg 76 ÷ (5 + 2 – 3) oe (= 19) or  5*x* + 2*x* – 3*x* = 76 **and** *x* = 76 ÷ (5 + 2 – 3) (=19) oe |  |  | M1 | For a correct method to find the value of 1 share |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | 3 × “19” (= 57) |  |  | M1 |  |
|  |  | “57” – 48.5(0) |  |  | M1 |  |
|  |  |  | 8.5(0) | 4 | A1 |  |
|  |  |  |  |  |  | **Total 4 marks** |

| 17 |  | **or**  **or** oe **or** oe **or** oe |  |  | M1 | for a correct linear scale factor (fraction or ratio) **or**  for the use of |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | oe **or****or** |  |  | M1 |  |
|  |  |  | 625 | 3 | A1 |  |
|  |  |  |  |  |  | **Total 3 marks** |

| 18 | (a) |  | 2 × 337 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | 2 × 343 × 24 × 337 **or**  25 × 3*p* (*p* ≠ 80) **or** 2*q* × 380 (*q* ≠ 5) |  | 2 | M1 |  |
|  |  |  | 25 × 380 |  | A1 |  |
|  |  |  |  |  |  | **Total 3 marks** |

| 19 |  | **or** (gradient =) |  | 4 | B1 | for correct gradient which may be seen in an equation.  Condone |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **or** (*m* =) |  |  | M1 | ft their gradient for use of  *m*1 × *m*2 = −1 |
|  |  | **or**   oe |  |  | M1 | ft dep on M1 |
|  |  |  |  |  | A1 | accept  must be exact values |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  | **Total 4 marks** |

| 20 |  | 5025 **or** 5.025 **or** 4975 **or** 4.975 |  | 4 | B1 | Accept  for 5025 or  for 5.025 |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | 1.845 × 10-3 oe **or** 1.835 × 10-3 oe |  |  | B1 | Accept  × 10-3 for 1.845 × 10-3 |
|  |  | oe |  |  | M1 | for correct substitution into    where    5 <  ≤ 5.025 **and**  1.835 × 10-3 ≤  < 1.84 × 10-3 |
|  |  |  | 2738.4 |  | A1 | dep on correct working |
|  |  |  |  |  |  | **Total 4 marks** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **Edexcel averages: scores of candidates who achieved grade** | | | | | | | |
| **Qn** | **Skill tested** | **Mean score** | **Max score** | **Mean %** | **ALL** | **9** | **8** | **7** | **6** | **5** | **4** | **3** |
| **1** | Trigonometry | 2.32 | 3 | 77 | 2.32 | 2.98 | 2.94 | 2.89 | 2.55 | 2.04 | 1.07 | 0.24 |
| **2** | Percentages | 4.92 | 6 | 82 | 4.92 | 5.89 | 5.66 | 5.39 | 5.15 | 4.61 | 3.77 | 2.59 |
| **3** | Statistical measures | 3.68 | 5 | 74 | 3.68 | 4.83 | 4.64 | 4.42 | 3.93 | 2.98 | 1.99 | 0.85 |
| **4** | Applying number | 2.02 | 3 | 67 | 2.02 | 2.91 | 2.58 | 2.28 | 1.96 | 1.56 | 0.90 | 0.48 |
| **5** | Trigonometry | 2.31 | 4 | 58 | 2.31 | 3.79 | 3.47 | 3.02 | 2.18 | 0.92 | 0.20 | 0.04 |
| **6** | Statistical measures | 2.30 | 4 | 58 | 2.30 | 3.75 | 3.27 | 2.80 | 2.05 | 1.18 | 0.60 | 0.09 |
| **7** | 3D shapes and volume | 2.90 | 5 | 58 | 2.90 | 4.62 | 4.06 | 3.49 | 2.72 | 1.62 | 0.76 | 0.12 |
| **8** | Polygons | 2.21 | 4 | 55 | 2.21 | 3.76 | 3.30 | 2.65 | 1.87 | 1.04 | 0.46 | 0.18 |
| **9** | Measures | 1.73 | 3 | 58 | 1.73 | 2.78 | 2.47 | 1.93 | 1.57 | 0.96 | 0.59 | 0.28 |
| **10** | Applying number | 2.31 | 4 | 58 | 2.31 | 3.62 | 3.02 | 2.55 | 2.07 | 1.57 | 1.02 | 0.62 |
| **11** | Angles, lines and triangles | 2.42 | 5 | 48 | 2.42 | 3.95 | 3.19 | 2.69 | 2.08 | 1.66 | 0.86 | 0.43 |
| **12** | Trigonometry and Pythagoras' Theorem | 2.73 | 6 | 46 | 2.73 | 5.02 | 3.70 | 3.06 | 2.13 | 1.27 | 0.54 | 0.34 |
| **13** | Graphical representation of data | 1.63 | 5 | 33 | 1.63 | 3.55 | 2.32 | 1.62 | 0.93 | 0.49 | 0.19 | 0.11 |
| **14** | Percentages | 1.08 | 3 | 36 | 1.08 | 2.31 | 1.65 | 0.96 | 0.75 | 0.32 | 0.09 | 0.02 |
| **15** | Trigonometry and Pythagoras' Theorem | 1.69 | 5 | 34 | 1.69 | 4.39 | 2.55 | 1.29 | 0.40 | 0.09 | 0.04 | 0.00 |
| **16** | Ratio and proportion | 1.36 | 4 | 34 | 1.36 | 3.19 | 1.75 | 1.02 | 0.79 | 0.48 | 0.09 | 0.00 |
| **17** | Similarity | 0.99 | 3 | 33 | 0.99 | 2.54 | 1.48 | 0.73 | 0.34 | 0.09 | 0.04 | 0.04 |
| **18** | Integers | 0.90 | 3 | 30 | 0.90 | 2.27 | 1.23 | 0.65 | 0.40 | 0.14 | 0.06 | 0.01 |
| **19** | Graphs | 1.03 | 4 | 26 | 1.03 | 2.99 | 1.35 | 0.54 | 0.17 | 0.06 | 0.01 | 0.00 |
| **20** | Degree of accuracy | 0.67 | 4 | 17 | 0.67 | 1.95 | 0.81 | 0.43 | 0.17 | 0.07 | 0.01 | 0.00 |
|  |  | **38.88** | **80** | **49** | **38.88** | **68.11** | **52.50** | **41.52** | **31.66** | **21.11** | **12.22** | **6.20** |

**Suggested grade boundaries**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Grade** | **9** | **8** | **7** | **6** | **5** | **4** | **3** |
| Mark | 59 | 47 | 37 | 26 | 17 | 9 | 4 |