| 1 |  | 8² + 15² (= 289) | 167 | 5 | M1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | M1 |  |
|  |  | **or** 0.5 × 15 × 8 (= 60) | M1 |  |
|  |  | – 0.5 × 15 × 8  ( “226.98” – “60”) | M1 |  |
|  |  |  | A1 | Accept answers which round to 167 |
|  |  |  |  |  |  | **Total 5 marks** |

| 2 | (a) |  | 70 < *s* ≤ 80 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | 10 × 45 + 16 × 55 + 19 × 65 + 23 × 75 + 12 × 85**or** 450 + 880 + 1235 + 1725 + 1020 (= 5310) |  | 4 | M2 | *f* × *d* for at least 4 products with correct mid-interval values and intention to add.  If not M2 then award M1  for *d* used consistently for at least 4 products within interval (including end points) and intention to add  **or**  for at least 4 correct products with correct mid-interval values with no intention to add |
|  |  | “5310” ÷ 80 |  |  | M1 | dep on at least M1 allow division by their provided addition or total under column seen |
|  |  |  | 66.4 |  | A1 | accept 66.37 – 66.4 |
|  |  |  |  |  |  | **Total 5 marks** |

| 3 | (a) | 520 – 465 (= 55) **or** (=1.118…) | 11.8 | 3 | M1 |  | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **or** 100 ×(“1.118” – 1) oe | M1 |  | |
|  |  | A1 | 11.8 or better (11.827956...) | |
| (b) | 0.12 × 550 oe (= 66) | 484 | 3 | M1 oe |  | M2 for  0.88 × 550 oe |
|  | 550 – “66” | M1 |  |
|  |  | A1 |  | |
|  |  |  |  |  |  | **Total 6 marks** | |

| **4** |  | 6 hrs 39 mins = 6.65 (hrs) or (mins) |  | 3 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Average speed =  oe eg |  | M1 | Use of *S* = *D* ÷ *T* (use of their time in hours)  [allow 429 ÷ 6.39 if B0 awarded] |
|  |  |  | 64.5 | A1 | Awrt 64.5 |
|  |  |  |  |  |  | **Total 3 marks** |

| 5 | (a) | for 0.035 × 40 000 oe (= 1400)  **or** 1.035 × 40 000 oe (= 41 400) | **OR** 40 000 × 1.0353 |  | 3 | M1 | for finding 3.5% **or** 103.5% of 40 000 | **OR** M2 for 40 000 × 1.0353  **or** 40 000 × 1.0354  (= 45 900.92)  (M1 for 40 000 × 1.0352 (= 42 849)) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 1.035 × “41 400” oe (= 42 849) 1.035 × “42 849” oe (= 44 348.72) |  |  | M1 | for completing method to find total amount in the account |
|  |  |  | | 44 349 |  | A1 | accept 44 348 – 44 349 | |
|  |  |  | |  |  |  | **SC:** if no other marks gained award M1 for  0.105 × 40 000 oe **or** 4200 **or** 44 200  accept (1 + 0.035) as equivalent to 1.035 throughout | |
|  | (b) | e.g. 30 481 ÷ (1 – 0.065) **or** 30 481 ÷ 0.935 | |  | 3 | M2  (M1) | for a complete method  for 30 481 ÷ (100 – 6.5) (= 326)  **or** (100 – 6.5)% = 30 481 **or** 93.5% = 30 481  **or** e.g. (1 – 0.065)*x* = 30 481 | |
|  |  |  | | 32 600 |  | A1 |  | |
|  |  |  | |  |  |  | **Total 6 marks** | |

| 6 |  | e.g. 0.7 × 20 160 oe (= 14 112)  **or** 0.3 × 20 160 oe (= 6048) |  | 4 | M1 |  | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | e.g. “14 112” ÷ (9 + 5 + 2) (= 882)  **or** (20 160 − “6048”) ÷ (9 + 5 + 2) (= 882) |  |  | M1 |  | M2 for  × “14 112” oe |
|  |  | e.g. 9 × “882” – 2 × “882” |  |  | M1 |  |
|  |  |  | 6174 |  | A1 |  | |
|  |  |  |  |  |  | **Total 4 marks** | |

| 7 |  | e.g.  **or** **or**  **or** **or**  **or** |  | 4 | M1 | for a correct trig ratio for *AB* **or** *AD*  accept 180 – 90 – 65 for 25 |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | e.g. (= 17.654…)**or** (= 17.654…) **or** (= 17.654…) **and** (= 7.460…)  **or** (= 7.460…)  **or** (= 7.460…) |  |  | M1 | for finding *AB* **and** *AD*  Allow use of Pythagoras  (= 7.460…)  or  (= 17.654…) |
|  |  | (“17.654…” × 2) + (“7.460…” × 2) oe |  |  | M1 | for a complete method to find the perimeter |
|  |  |  | 50.2 |  | A1 | accept 49.6 – 50.6 |
|  |  |  |  |  |  | **Total 4 marks** |

| 8 |  | 5 × 398 (= 1990) or 6 × 401 (= 2406) |  | 3 | M1 | Correct total for 5 or for 6 cocoa pods |
| --- | --- | --- | --- | --- | --- | --- |
|  | “2406” – “1990” |  | M1 | (M2 for 398 + 6  3 or 401 + 5 × 3) |
|  |  | 416 | A1 |  |
|  |  |  |  |  |  | **Total 3 marks** |

| 9 | (a) |  |  | 2 | M1 | for use of cf at 45 |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 146 |  | A1 | accept in the range 145 – 147 |
|  | (b) | 93.75 ÷ 3.75 (= 25) |  | 3 | M1 |  |
|  |  | Using cf diagram at 90 – “25” (= 65) |  |  | M1 | for use of cf at “65” |
|  |  |  | 151 |  | A1 | accept in the range 150 – 152 |
|  |  |  |  |  |  | **Total 5 marks** |

| 10 |  | eg (= 91) or  eg  or  egor  eg |  | 3 | M1 | For clear intention to multiply all terms by 20 (or 4 × 5) or a multiple of 20 oe  or to express LHS as two fractions over 20 (or 4 × 5) or a multiple of 20 oe or as a single fraction with a denominator of 20 (or 4 × 5) or a multiple of 20 oe  if expanded numerator, allow one error |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | eg 36*a* – 28 −15*a* + 35 = 20 × 4.55 or  21*a* = 84 oe |  | M1 | Expanding brackets and multiplying by denominator with no more than one sign error |
|  |  |  | 4 | A1 | dep on M1 |

| 11 | (a) (i) |  | 62 | 3 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (a) (ii) |  | 118 | B1ft | 180 – their (a)(i) |
|  | (b) |  | 62 | B1 |  |
|  |  |  |  |  |  | **Total 3 marks** |

| 12 |  | 9.55 **or** 9.65 **or** 3.75 **or** 3.85 **or** 1.835 **or** 1.845 |  | 3 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | e.g. |  |  | M1 | for correct substitution of  9.6 < *UBv* 9.65  **and** 3.75 *LBu*< 3.8  **and** 1.835 *LBt* < 1.84 |
|  |  |  | 3.22 |  | A1 | accept 3.21 – 3.22 from correct working |
|  |  |  |  |  |  | **Total 3 marks** |

| 13 |  | 2 × *π* × 7 (= 43.982… or 14*π*)**or** (2 × *π* × 7) ÷ 2 (= 21.991… or 7*π*)**or** 2 × *π* × 9 (= 56.548… or 18*π*)**or** (2 × *π* × 9) ÷ 2 (= 28.274… or 9*π*) |  | 3 | M1 | for finding the circumference of either the full circle or the length of the arc for either semicircle |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | e.g. “21.991” + “28.274” (= 50.26…)**or** “7*π*” + “9*π*” (=16*π*)**or** “21.991” + “28.274” + 2 (= 52.26…)**or** “7*π*” + “9*π*” + 2 (= 52.26…)**or** “21.991” + “28.274” + 2 + 2**or** “7*π*” + “9*π*” + 2 + 2 |  |  | M1 | for a method to find the length of the two arcs with intention to add |
|  |  |  | 54.3 |  | A1 | accept 54.2 – 54.3 |
|  |  |  |  |  |  | **Total 3 marks** |

| 14 |  | **or** eg(or 3.36) **or**eg (or 336) |  | 3 | M1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | oe **or** oe **or** eg  oe | M1 | or 0.48 or 48% or correct unsimplified fraction eg |
|  |  | A1 | cao |
|  |  |  |  |  |  | **Total 3 marks** |

| 15 |  | e.g. 30 × 20 × 125 (= 75 000)  **or** 85 × 40 × 125 (= 425 000)  **or** oe |  | 4 | M1 | for a method to find the volume of water already pumped out **or** the volume of water left **or** the total volume of the container |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | “75 000” ÷ 1.5 (= 50 000)**or** “75 000” ÷ 90 (= 833.3... or )**or**  **or** |  |  | M1 | M2 for× 1.5 oe (= 8.5)  **or** × 1.5 oe (= 10) |
|  |  | “425 000” ÷ “50 000” (= 8.5)**or** “425 000” ÷ (“833.3...” × 60) oe (= 8.5)**or** “5.66…” × 1.5 (= 8.5) **or** “6.66…” × 1.5 (= 10) |  |  | M1 |
|  |  |  | 20 30 |  | A1 | Allow 8 30 (pm) |
|  |  |  |  |  |  | **Total 4 marks** |

| 16 |  | (*BC*2 = ) 1502 + 2752 – (2 × 150 × 275 × cos120) (= 139 375) |  | 5 | M1 | for correct substitution into the cosine rule |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | (*BC* =)  oe or  or  or 373.… |  |  | M1 | for correct order of operations and square root |
|  |  | e.g.  **or**  **or**  **or**  **or**  **or** |  |  | M1 | (dep on 1st M1) ft 373…  for a correct trig statement involving angle *ABC*  **or** angle *ACB* |
|  |  | (= 39.6…)  **or** (= 39.6…)  **or** (= 20.3…)  **or** (= 20.3…) |  |  | M1 | for a complete method to find angle *ABC* **or** angle *ACB* |
|  |  |  | 140 |  | A1 | accept 140 – 140.4 |
|  |  |  |  |  |  | **Total 5 marks** |

| 17 | (a) | 63 ÷ 1.5 (= 42) **or** a correct value written on FD scale (10 small squares = FD 10) **or**  10 squares = 1 parcel or 1 big square = 2.5 parcels oe  eg area = 18 × 5 + 15 × 42 + 10 × 24 + 10 × 30 + 20 × 8 (= 1420)  3.6 × 1 + 3 × 8.4 + 2 × 4.8 + 2 × 6 + 4 × 1.6 (= 56.8) (at least 3 bars correct for any method of summing area) |  | 3 | M1 | For use of area related to frequency eg showing a correct unambiguous value on the frequency density scale or calculating the area in some form |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | 0.5 × 18 + 63 + 1 × 24 + 1 × 30 + 2 × 8 (9 + 63 + 24 + 30 + 16) oe  eg “1420” ÷ 10 or “56.8” × 2.5 oe |  | M1 | Total of 5 frequencies with just one error or  Area of bars with just one error, with correct calculation to give frequency |
|  |  |  | 142 | A1 |  |
|  | (b) | 0.75 × 24 (= 18) + 30 + 16 (= 64) oe Eg “their (a)” – (9 + 63 + 0.25 × 24) (= 64)  (ft figures from (a) dep on M1 for (a)) |  | 3 | M1ft | (dep on M1 in (a))if working with small squares they may get eg |
|  |  | (ft their value of 142 from (a)) |  | M1 | 64 must come from correct working allow (ft their value of 142 from (a)) |
|  |  |  |  | A1 | 0.201 or better (0.20137…) |
|  |  |  |  |  |  | **Total 6 marks** |

| 18 |  | **or**  **or** 1.33(33...) **or** 4:3  **or**  **or**  **or** 0.75 **or** 3:4 |  | 3 | M1 | for a correct length scale factor or a correct length ratio |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | e.g. 1120 ÷ oe **or** 1120 × oe |  |  | M1 | (dep on M1) for a correct method to work out the surface area of A |
|  |  |  | 630 |  | A1 |  |
|  |  |  |  |  |  | **Total 3 marks** |

| 19 |  | eg (*AD* =) (= 5.07…)**or** 2 × 6sin25 (=5.07...) **or** oe |  | 6 | M1 | Correct expression for *AD*  ie *AD* = … or *x* = oe |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | eg 6 + 6 + or 12 +“5.07…” (=17.0)7... or 17.1) |  | M1 | A **correct** statement of perimeter of triangle *OAD* |
|  |  | eg (arc *BC*=)  oe |  | M1 | A correct statement for arc *BC*  (condone missing brackets around (6 + *x*) for this mark only) |
|  |  | eg oe |  | M1 | dep on M3 for a correct equation for *x* |
|  |  | eg |  | M1 | isolatingterms in *x* in a correct equation |
|  |  |  | 5.89 |  | A1 | 5.88 – 5.89 |
|  |  |  |  |  |  | **Total 6 marks** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Edexcel averages: scores of candidates who achieved grade:** | | | | | | | | |
| **Qn** | **Paper** | **Question** | **Mean score** | **Max score** | **Mean %** | **ALL** | **9** | **8** | **7** | **6** | **5** | **4** | **3** | **U** |
| **1** | 2H | Q08 | 3.83 | 5 | 77 | 3.83 | 4.90 | 4.77 | 4.59 | 4.14 | 3.07 | 1.33 | 0.49 | 0.29 |
| **2** | 1H | Q02 | 3.98 | 5 | 80 | 3.98 | 4.92 | 4.76 | 4.50 | 4.09 | 3.39 | 2.41 | 1.42 | 0.38 |
| **3** | 2H | Q03 | 4.93 | 6 | 82 | 4.93 | 5.78 | 5.44 | 5.37 | 5.02 | 4.48 | 3.95 | 2.56 | 1.05 |
| **4** | 2H | Q01 | 2.34 | 3 | 78 | 2.34 | 2.97 | 2.81 | 2.60 | 2.41 | 1.85 | 1.40 | 0.62 | 0.37 |
| **5** | 1H | Q07 | 4.37 | 6 | 73 | 4.37 | 5.79 | 5.45 | 5.08 | 4.26 | 3.10 | 2.18 | 1.29 | 0.44 |
| **6** | 1H | Q01 | 2.99 | 4 | 75 | 2.99 | 3.80 | 3.67 | 3.34 | 2.96 | 2.52 | 1.74 | 0.66 | 0.36 |
| **7** | 1H | Q10 | 2.58 | 4 | 65 | 2.58 | 3.79 | 3.53 | 3.21 | 2.53 | 1.30 | 0.38 | 0.14 | 0.00 |
| **8** | 2H | Q07 | 1.89 | 3 | 63 | 1.89 | 2.92 | 2.56 | 2.21 | 1.55 | 0.96 | 0.42 | 0.24 | 0.07 |
| **9** | 1H | Q11 | 3.29 | 5 | 66 | 3.29 | 4.54 | 3.98 | 3.53 | 3.04 | 2.31 | 1.87 | 1.16 | 0.65 |
| **10** | 2H | Q14a | 1.91 | 3 | 64 | 1.91 | 2.89 | 2.61 | 2.10 | 1.66 | 1.06 | 0.46 | 0.30 | 0.03 |
| **11** | 2H | Q13 | 1.88 | 3 | 63 | 1.88 | 2.77 | 2.44 | 2.01 | 1.61 | 1.19 | 0.83 | 0.27 | 0.20 |
| **12** | 1H | Q15 | 1.77 | 3 | 59 | 1.77 | 2.92 | 2.59 | 1.98 | 1.36 | 0.66 | 0.22 | 0.11 | 0.00 |
| **13** | 1H | Q08 | 1.36 | 3 | 45 | 1.36 | 2.51 | 1.84 | 1.41 | 0.89 | 0.40 | 0.25 | 0.05 | 0.00 |
| **14** | 2H | Q10 | 1.41 | 3 | 47 | 1.41 | 2.55 | 1.94 | 1.39 | 0.92 | 0.53 | 0.29 | 0.08 | 0.01 |
| **15** | 1H | Q03 | 1.63 | 4 | 41 | 1.63 | 3.01 | 2.08 | 1.73 | 1.09 | 0.67 | 0.26 | 0.05 | 0.00 |
| **16** | 1H | Q16 | 2.23 | 5 | 45 | 2.23 | 4.48 | 3.53 | 1.84 | 1.04 | 0.41 | 0.09 | 0.03 | 0.08 |
| **17** | 2H | Q15 | 2.10 | 6 | 35 | 2.10 | 4.08 | 3.09 | 2.09 | 1.20 | 0.39 | 0.14 | 0.04 | 0.01 |
| **18** | 1H | Q20 | 1.24 | 3 | 41 | 1.24 | 2.70 | 1.95 | 0.97 | 0.40 | 0.10 | 0.02 | 0.00 | 0.00 |
| **19** | 2H | Q22 | 1.45 | 6 | 24 | 1.45 | 3.53 | 1.89 | 0.93 | 0.49 | 0.18 | 0.04 | 0.00 | 0.00 |
|  |  |  | **47.18** | **80** |  | **47.18** | **70.85** | **60.93** | **50.88** | **40.66** | **28.57** | **18.28** | **9.51** | **3.94** |

**Suggested grade boundaries**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Grade** | **9** | **8** | **7** | **6** | **5** | **4** | **3** |
| Mark | 71 | 66 | 55 | 35 | 23 | 14 | 7 |