| 1 |  | 19.3 × 150 |  | 2 | M1 | for 19.3 × 150 |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 2895 |  | A1 | for 2895 |
|  |  |  |  |  |  | ***Total 2 marks*** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **2** | | (a) | |  | | 3 < *w* ≤ 4 | 1 | | B1 | | | |
|  | | (b) | | (12 × 2.5) + (16 × 3.5) + (9 × 4.5) +(2 × 5.5) + (1 × 6.5)**or**30 + 56 + 40.5 + 11 + 6.5 (= 144) | |  | 4 | | M2 for at least **4** correct products added (need not be evaluated) **or**  If not M2 then award  M1 for consistent use of value within interval (including end points) for at least **4** products which must be added  **or**  correct midpoints used for at least **4** products and not added | | | |
|  | |  | | [(12 × 2.5) + (16 × 3.5) + (9 × 4.5) +(2 × 5.5) + (1 × 6.5)] ÷ 40 **or**  ‘144’ ÷ 40 | |  |  | | M1 dep on at least M1  Allow division by their Σ*f* provided addition or total under column seen | | | |
|  | |  | |  | | 3.6 |  | | A1 oe | | | |
|  | | (c) | |  | |  | 2 | | M1 for  where 0 < *a* < 40 or  where *b* > 3 where *a* and *b* are integers | | | |
|  | |  | |  | |  |  | | A1 0.075 oe | | | |
|  | |  | | | |  |  | | **Total 7 marks** | | | |
| 3 | |  | | 1 – (0.24 + 0.31) (= 0.45) Or  (0.24 + 0.31) × 180 (= 99) | | |  | | 4 | M1 | or for a correct equation for missing values eg  *x* + 0.24 + 2*x* + 0.31 = 1 oe  (can be implied by 2 probabilities that total 0.45 in table if not contradicted in working space) | |
|  | |  | | ‘0.45’ ÷ 3 (= 0.15) Or  ‘0.45’ × 180 (= 81)  Or  180 − 99 (= 81) | | |  | |  | M1 | (or 0.15 correctly placed in table as long as not contradicted) | |
|  | |  | | ‘0.15’ × 180 Or  ‘81’ ÷ 3 | | |  | |  | M1 | or for an answer of | |
|  | |  | |  | | | 27 | |  | A1 |  | |
|  | |  | |  | | |  | |  |  | ***Total 4 marks*** | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **4** | (a) |  | 0.000 78 | 1 | B1 |
|  | (b) | 22 500 000 oe e.g. 22.5 × 106**or**  2.25 × 10*n**n* ≠ 7 |  | 2 | M1 |
|  |  |  | 2.25 × 107 |  | A1 |
|  |  | |  |  | **Total 3 marks** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **5** |  | cos 63 =  **or**sin 27 = **or****or** oe |  | 3 | M1 for a correct trigonometric ratio | M2 for  oe  **and**  oe |
|  |  | (*PQ* =) **or**(*PQ* =) **or** |  |  | M1 for a correct rearrangement for *PQ* |
|  |  |  | 53.5 |  | A1 Accept 53.5 - 53.53 | |
|  |  | |  |  | **Total 3 marks** | |

| 6 | (a) |  |  | 2 | B1 | for and on the first branch  (0.65 and 0.35) |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Correct probabilities on the tree diagram |  | B1 | for on the second branch  (accept 2 dp or better 0.6315..., 0.3684..., 0.6842..., 0.3157...) |
|  | (b) | oe only |  | 2 | M1 | ft from (a) as long as probabilities less than 1 |
|  |  |  |  |  | A1 | for  oe or 0.11… (at least 2 dp) |
|  |  |  |  |  |  | ***Total 4 marks*** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **7** |  | 120 ÷ (3 + 5) (= 15) |  | 6 | M1 | M2 for  (= 45) **or**  (= 75) oe |
|  |  | ‘15’ × 3 (= 45) **or** ‘15’ × 5 (= 75) |  |  | M1 |
|  |  | ‘45’ ÷ 3 (= 15) **or**  ‘45’ ÷ 3 × 2 (= 30) |  |  | M1 | |
|  |  | ‘75’ ×  (= 48) **or** ‘75’ ×  (= 27) |  |  | M1 | |
|  |  | E.g.(‘45’ ÷ 3 × 2) + (‘75’ × ) oe **or** ‘27’ + ‘30’ **or**  (‘75’ – ‘48’) + (‘45’ – ‘15’) |  |  | M1 for a complete method | |
|  |  |  | 57 |  | A1 | |
|  |  | |  |  | **Total 6 marks** | |

| *8* | | *(a)* | 545 – 500 ( = 45) **or** 592 – 545 ( = 47) |  | 4 | M1 | may be seen as part of a calculation | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | |  |  |  | M1 | for one correct expression (allow 8 or 8.7 from a correct expression for 8.6 throughout) | | |
|  | |  |  |  |  | M1 | for both correct expressions **or** having found “9%” finds 109% of 545: 1.09 × 545(=594.05) or 9% of 545 (49.05) or having found “8.6%” finds 108.6% of 500: 1.086 × 500(=543) or 8.6% of 500 (43) | | |
|  | |  |  | No, 9(%) and 8.6(%) |  | A1 | for no oe, 9% and 8.6% seen or  no oe and 9% and 594.05 or 8.6% and 543 or  No, 49.05 > 45 or No 594.05 > 592 oe | | |
| **Alternative mark scheme for 8(a)** | | | | | | | | | |
|  | |  |  |  | 4 | M3 | for both correct expressions which should lead to 109 **or** 1.09 **and** 108.6 **or**1.086  (allow 108 or 108.7 from correct working for 108.6 or 1.08 or 1.087 from correct working for 1.086 throughout)  (if not M3 then award M2 for one of these expressions) | | |
|  | |  |  |  |  |
|  | |  |  | No, 109(%) and 108.6(%) |  | A1 | oe eg no and 1.09 and 1.086 | | |
|  | | *(b)* | 952 ÷ 85 × 100 oe (=1120) |  | 3 | M1 | for a method to find price before discount | | M2 for |
|  | |  | 0.15 × “1120” or “1120” – 952 oe |  |  | M1 | for a correct method to find discount | |
|  | |  |  | 168 |  | A1 | |  | |
|  | |  |  |  |  |  | | ***Total 7 marks*** | |

| 9 |  | **Litres per amount of money and then conversion** |  |  |  | | | |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | *l*/$ |  |  | M1 | | | Number of litres per $ for D | |
|  |  | *l*/k |  |  | M1 | | | Number of litres per Krone for A | |
|  |  | A: *l*/$ to *l*/k ‘1.1168’ ÷ 6.57 (= 0.1699..)orD: *l*/k to *l*/$ ‘0.168’ × 6.57 (= 1.103..) |  |  | M1 | | | *l*/$ to *l*/k for A or *l*/k to *l*/$ for D | |
|  |  |  | Arctic Oil and relevant figures |  | A1 for Arctic Oil with 1.1168… and 1.10376… **or** 0.168 and 0.1699.. | | | | |
|  |  | **Conversion then litres per amount of money** |  |  |  | | | | |
|  |  | or 770 000 × 6.57(= 505 8900) |  |  | M1 | | | Changing Krone to $ or $ to Krone | |
|  |  | or |  |  | M1 | | | Litres per Krone or litres per $ for D | |
|  |  | or |  |  | M1 | | | Litres per Krone or litres per $ for A | |
|  |  |  | Arctic Oil and relevant figures |  | A1 for Arctic Oil with 1.1168… and 1.10376… **or** 0.168 and 0.1699.. | | | | |
|  |  | **Cost per litre then conversion** |  |  |  | | | | |
|  |  |  |  |  | M1 | | Price per litre in Krone for D | | |
|  |  |  |  |  | M1 | | Price per litre in $ for A | | |
|  |  | ‘5.952’ ÷ 6.57(=0.9059..) or ‘0.895’ × 6.57(= 5.882..) |  |  | M1 | Conversion of Krone to $ or $ to Krone | | | |
|  |  |  | Arctic Oil and relevant figures |  | A1 | For Arctic Oil with 5.952 and 5.882 **or** 0.895 and 0.9059 | | | |

| 9 |  | | **Conversion then cost per litre** | | |  | |  | |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | or 770 000 × 6.57(= 505 8900) | | |  | |  | | M1 | Changing Krone to $ or $ to Krone |
|  |  | | or | | |  | |  | | M1 | Cost per litre in Krone or cost per litre in $ for D |
|  |  | | or | | |  | |  | | M1 | Cost per litre in $ or cost per litre in Krone for A |
|  |  | |  | | | Arctic Oil and relevant figures | |  | | A1 | For Arctic Oil with 5.952 and 5.882 **or** 0.895 and 0.9059 |
|  |  | | **Comparing equal amounts** | | |  | |  | |  |  |
|  |  | |  | |  |  | |  | | M1 | Multiplier for same amount of D as A or same amount of A as D |
|  |  | | ‘2.047..’×2500 000 K (=5119047.619..)K | | ‘2.047..’ × 770 000 $ (=376046.511..)$ |  | |  | | M1 | Cost of equal amount of D as A or  A as D |
|  |  | | ‘5119047.619’÷6.57 = 779154.88…$ or  770 000×6.57=5058900 K | | ‘376046.511..’× 6.57 =2470625.58..K or  2500 000÷6.57 = 380517..$ |  | |  | | M1 | Converts so can compare costs – either K to $ or original A to K or  $ to K or original D to $ |
|  |  | |  | |  | Arctic Oil and relevant figures | |  | | A1 | Arctic Oil and 779154.. or with 2470625..(figures may be rounded)  Or  Arctic Oil with 5119047… and 5058900 or with 376046.. and 380517 |
| Students may compare other equal amounts – please use the scheme that best fits their method and award marks appropriately. | | | | | | | | | | | |
|  | |  | |  | |  |  | | ***Total 4 marks*** | | |

| 10 |  | 50 × 60 (= 3000) or 50 ÷ 1000 (= 0.05 or ) or 50 × 60 × 60 (= 180 000) or  or    or  1000 ÷ 60 ÷ 60 (= 0.27777…. or ) |  | 3 | M1 | for 50 with at least one of ÷ 1000 or × 60  or    or    1000 ÷ 60 ÷ 60 |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | oe eg 50 ÷ |  |  | M1 | (dep) for a complete method |
|  |  |  | 180 |  | A1 | for 180  (SCB1 for both conversion factors correct but applying them wrongly eg ) |
|  |  |  |  |  |  | ***Total 3 marks*** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **11** | (a) | or |  | 2 | M1 for a correct method to find one coordinate **or** for one coordinate correct **or** for (−1.5, 9) |
|  |  |  | (9, −1.5) |  | A1 Accept (9, −) |
|  | (b) |  | −3 | 1 | B1 |
|  | (c) |  | No with reason | 1 | B1 No (oe) and e.g. line goes through (100, −298) or (101.3..), −302) or  or (3 × 100) – 302 = −2 not (+)2 |
|  |  |  |  |  | **Total 4 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **12** |  | 6000 × 1.0152 (= 6181.35) **or**  6000 + (0.015 × 6000) + (0.015 × (6000 + ‘90’)) (= 6181.35) **or**  (1.015)2 (= 1.030225) **or** |  | 3 | M1 for working out the total amount after **two** years  **or** working out the compound interest multiplier after two years  **or** working out the compound interest multiplier after three years |
|  |  | 6311.16 ÷ ‘6181.35’ (= 1.021) (×100) **or**  (= 1.021) (×100) **or**  ‘1.05186’ ÷ ‘1.030225’ (= 1.021) (×100) |  |  | M1 (dep on M1) for a complete method to find the compound interest multiplier (×100) |
|  |  |  | 2.1 |  | A1 awrt 2.1 |
|  |  | |  |  | **Total 3 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **13** |  | oe **or** 56 ÷ 0.14 (= 400) |  | 4 | M1 for using the given formula correctly |
|  |  | **or**  (=20) |  |  | M1 for a method to find *w* |
|  |  | ‘20’ × ‘20’ × ‘20’ oe |  |  | M1 (dep on M2) for a method to find the volume of the cube |
|  |  |  | 8000 |  | A1 |
|  |  | |  |  | **Total 4 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **14** |  | (*AH* =) (= ) **or** (*FH* = *GE* =)  (=  ) |  | 4 | M1 for working out *AH* or *FH* or *GE* |
|  |  | E.g.  sin *AHF* = **or** tan *AHF* = **or**  cos *AHF* =  **or**  sin *FAH* =  **or** cos *FAH* =  **or**  tan *FAH* = |  |  | M1 for a correct method for finding angle *AHF* **or** finding angle *FAH*  Allow  cos *AHF* = oe **or**  sin *AHF* =oe |
|  |  | E.g.  **or**  **or**  **or**  **or**  **or** |  |  | M1 for a complete method  Allow  oe **or**  oe |
|  |  |  | 30.2 |  | A1 for 30.2 – 30.3 |
|  |  | |  |  | **Total 4 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **15** | (a) | (0.5 ×) 9.3 × 14.7 × sin106 **or**  (9.3 × cos 16) × 14.7 **or**  (9.3 × sin 74) × 14.7 |  | 2 | M1 for applying the area of a triangle formula using correct values (to find half of the area of the parallelogram) **or**  for a correct method to find the area of the parallelogram |
|  |  |  | 131 |  | A1 awrt 131 |
|  | (b) | (*GE*2 =) 9.32 + 14.72 – 2 × 9.3 × 14.7 × cos106 |  | 3 | M1 for the correct use of the cosine rule |
|  |  | 377(.9….) **or** 378 **or** 86.49 + 216.09 + 75.3… **or**  302.58 + 75.3…. |  |  | M1 (dep on M1)for the correct order of operations |
|  |  |  | 19.4 |  | A1 for 19.4 – 19.5 |
|  |  | |  |  | **Total 5 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **16** |  | 58.35 or 58.45 or  19.5 or 20.5 or  3.55 or 3.65 |  | 3 | B1 for any correct bound  Accept for 58.45 or  for 20.5 or  for 3.65 |
|  |  | (= 27.4366...) |  |  | M1 for correct substitution into    where    58.4 < *a*UB ≤ 58.45 **and**  19.5 ≤ *c*LB < 20 **and**  3.55 ≤ *d*LB < 3.6 |
|  |  |  | 27.44 |  | A1 from correct working  allow 27.4 – 27.5 |
|  |  | |  |  | **Total 3 marks** |

| 17 |  | Angle *CAD* = 28° or angle *ACB* = 32° orangle *ACD* = 90° or angle *ABD* = 90° |  | 4 | M1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 30° |  | A1 | For a correct answer of 30 |
|  |  | **Angles** in the **same segment** areequal,  **angle** in a **semicircle** is 90° (or **angle** at centre is **double** angle at **circumference** oe)  angles in a **triangle** add up to **180°**/**angles** in a **triangle**  **isosceles** triangle  **alternate** angles  vertically **opposite angles (or vertically opposite)**  **angles** at a **point**  **opposite angles** in a **cyclic quad**rilateral  angle between **tangent** and **radius (diameter)**  **alternate segment** theorem  **angles subtended** by the **same arc(**or **chord**) at the **circumference** (or **on the circle)** |  |  | B2 | Dep on M1 for all correct reasons for their method used  (if not B2 then award B1(dep on M1) for a correct circle theorem reason) |
|  |  |  |  |  |  | ***Total 4 marks*** |

**

| 18 |  | oe |  | 6 | M1 | for substituting into volume formula for cone correctly and equating to 1600 | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | eg  or |  |  | M1 | dep for correct rearrangement of volume formula for *r* | |
|  |  |  |  |  | M1 | Dep on M2 correct method to find slant height of cone (radius of sector) | |
|  |  | 2 × *π* × “7.817…” (= 49.1196…)**or** |  |  | M1 | for using oe using figures from correct method  **or**  for using  using figures from correct method | |
|  |  | **or** |  |  | M1 | for using arc length =  **or**  for using area of sector = | |
|  |  |  | 107° |  | A1 | for 107° – 108° | |
|  |  |  |  |  |  | | ***Total 6 marks*** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **19** | oe **or** oe **or**  oe |  | 4 | M1 for finding *BBB* **or** *OOO*  **or**  *LLL* | M3 for  oe |
|  | oe **or** oe  **or**  oe **or**  oe **or**  oe **or**  oe **or**  oe  **or**  oe or  oe |  |  | M1 for finding the following in any order  *BOO* **or** *BBO*  **or**  *LLB* **or** *LLO* **or** *LBB* **or** *LOO* **or** *LOB*  **or**  *LLX* **or** *LXX* **(***X* = not *L*) |
|  | oe **or**  oe **or**  oe |  |  | M1 for a complete method |
|  |  |  |  | A1 for  oe e.g.or 0.29(464...) | |
|  |  |  |  | **Total 4 marks** | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Practice Papers Set 12 – 2H-3H** | | | | **Edexcel averages: scores of candidates who achieved grade:** | | | | | | | | |
| **Qn** | **Paper** | **Question** | **Skill tested** | **Max score** | **Mean %** | | **ALL** | **9** | **8** | **7** | **6** | **5** | **4** | **3** |
| **1** | **2H** | Q09 | Measures | 2 | 82 | | 1.64 | 1.99 | 1.95 | 1.86 | 1.74 | 1.52 | 1.34 | 1.15 |
| **2** | **1H** | Q04 | Probability | 7 | 78 | | 5.49 | 6.92 | 6.74 | 6.40 | 5.96 | 5.29 | 4.26 | 3.33 |
| **3** | **2H** | Q06 | Probability | 4 | 75 | | 2.99 | 3.93 | 3.83 | 3.64 | 3.26 | 2.94 | 2.04 | 1.35 |
| **4** | **1H** | Q06 | Standard form | 3 | 78 | | 2.33 | 2.93 | 2.82 | 2.69 | 2.51 | 2.21 | 1.85 | 1.53 |
| **5** | **1H** | Q09 | Trigonometry and Pythagoras' Theorem | 3 | 71 | | 2.12 | 2.92 | 2.84 | 2.69 | 2.40 | 1.96 | 1.34 | 0.55 |
| **6** | **2H** | Q14 | Probability | 4 | 63 | | 2.50 | 3.88 | 3.57 | 3.27 | 2.62 | 1.79 | 1.15 | 0.80 |
| **7** | **1H** | Q05 | Ratio and proportion | 6 | 65 | | 3.92 | 5.71 | 5.29 | 4.79 | 4.40 | 3.55 | 2.29 | 1.34 |
| **8** | **2H** | Q08 | Percentages | 7 | 65 | | 4.54 | 6.64 | 6.19 | 5.39 | 4.74 | 3.88 | 2.68 | 1.85 |
| **9** | **2H** | Q12 | Applying number | 4 | 63 | | 2.50 | 3.69 | 3.25 | 2.92 | 2.58 | 2.15 | 1.63 | 1.09 |
| **10** | **2H** | Q10 | Measures | 3 | 60 | | 1.81 | 2.85 | 2.43 | 2.13 | 1.71 | 1.42 | 1.15 | 0.73 |
| **11** | **1H** | Q01 | Graphs | 4 | 53 | | 2.11 | 3.66 | 3.38 | 2.72 | 1.96 | 1.34 | 0.78 | 0.50 |
| **12** | **1H** | Q11 | Percentages | 3 | 56 | | 1.69 | 2.76 | 2.44 | 2.03 | 1.64 | 1.35 | 0.91 | 0.54 |
| **13** | **1H** | Q13 | Measures | 4 | 52 | | 2.08 | 3.76 | 3.28 | 2.61 | 1.91 | 1.32 | 0.72 | 0.49 |
| **14** | **1H** | Q19 | Trigonometry and Pythagoras' Theorem | 4 | 43 | | 1.73 | 3.86 | 3.36 | 2.29 | 1.24 | 0.43 | 0.14 | 0.05 |
| **15** | **1H** | Q14 | Trigonometry and Pythagoras' Theorem | 5 | 44 | | 2.19 | 4.35 | 3.81 | 2.78 | 2.03 | 0.97 | 0.51 | 0.22 |
| **16** | **1H** | Q16 | Degree of accuracy | 3 | 42 | | 1.26 | 2.70 | 2.33 | 1.61 | 0.99 | 0.47 | 0.19 | 0.09 |
| **17** | **2H** | Q13 | Circle properties | 4 | 39 | | 1.55 | 2.96 | 2.40 | 1.77 | 1.42 | 1.01 | 0.64 | 0.36 |
| **18** | **2H** | Q26 | 3D shapes and volume | 6 | 33 | | 1.96 | 4.64 | 3.33 | 2.31 | 1.42 | 0.75 | 0.40 | 0.14 |
| **19** | **1H** | Q18 | Probability | 4 | 25 | | 1.00 | 2.88 | 1.89 | 1.03 | 0.48 | 0.21 | 0.02 | 0.00 |
|  |  |  | **TOTAL** | **80** | **57** | | **45.41** | **73.03** | **65.13** | **54.93** | **45.01** | **34.56** | **24.04** | **16.11** |

**Suggested grade boundaries**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Grade** | **9** | **8** | **7** | **6** | **5** | **4** | **3** |
| Mark | 69 | 60 | 50 | 40 | 29 | 20 | 16 |