| Q | | **Working** | **Answer** | **Mark** | **Notes** | |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | (a) |  | −8, −4, −1, 3, 7 | 1 | B1 | cao |
|  | (b) |  | 0.007, 0.078, 0.4, 0.407, 0.8 | 1 | B1 | cao |
|  | (c) |  | 0.6 | 1 | B1 | cao |
|  | (d) |  | 90 | 1 | B1 | cao |
|  | (e) |  | 0.35 | 1 | B1 | cao |
|  |  |  |  |  |  | **Total 5 marks** |

| 5 | (a) |  |  | 1 | B1 | cao |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | 840 ÷ 7 × 3 or  oe |  |  | M1 | Allow 840 × 0.42(85...) |
|  |  |  | 360 | 2 | A1 | cao |
|  | (c) | oe e.g. , etc |  |  | M1 |  |
|  |  |  |  | 2 | A1 | cao |
|  | (d) | 8 ÷ 2 × 9 or  oe |  |  | M1 |  |
|  |  |  | 36 | 2 | A1 | cao |
|  |  |  |  |  |  | **Total 7 marks** |

| 7 | (a) |  | (−2, 4) | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) |  | point plotted | 1 | B1 | Unambiguous |
|  | (c) |  | *x* = 3 drawn | 1 | B1 | Minimum 2 cm long |
|  |  |  |  |  |  | **Total 3 marks** |

| 9 | (a) | 2 × (−3)2 – 7×(−3) oe e.g. 2(9) –(−21)or 2×9 + 21 or 18 + 21 |  |  | M1 | Brackets must be round (−3)² |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 39 | 2 | A1 |  |
|  | (b) | 4*x* + 12 = 9*x* – 10 or oe |  |  | M1 | for 4*x* + 12 (may not be in an equation) or for dividing RHS by 4 |
|  |  | 12 + 10 = 9*x* – 4*x* or −9*x* + 4*x* = −12 −10 or 22 = 5*x* or −5*x* = −22 or 3 + 2.5 = 2.25*x* – *x* or 1.25*x* = 5.5 |  |  | M1 | (ft from 4*x* + b = 9*x* + 10)  for all terms in *x* isolated on one side and numbers on other side |
|  |  |  | 4.4 | 3 | A1 | for 4.4 oe eg.  ,  dep on at least M1 |
|  | (c) |  | −1, 0, 1, 2, 3 | 2 | B2 | B1 for −2, −1, 0, 1, 2 or list with one error or omission: e.g. −2, −1, 0, 1, 2, 3 **;** −1, 0, 1, 2 ;  −1, 1, 2, 3, etc |
|  |  |  |  |  |  | **Total 7 marks** |

| 11 |  | or |  |  | M1 | or for (−1.5 , *y*) or (*x*, 7) or (7, −1.5) |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | (−1.5 , 7) | 2 | A1 | oe |
|  |  |  |  |  |  | **Total 2 marks** |

| 13 |  |  | *T* = 6*m* + 9*g* | 3 | B3 | Or *T* = 3(2*m* + 3*g*) [award B2 if *T* = 6*m* + 9*g* is incorrectly simplified](condone *T* = 6×*m* + 9×*g*)  if not B3 then  B2 for *T* = 6*m* + *kg* **or** *T* =*km* + 9*g* (*k* may be zero) **or** 6*m* + 9*g*  if not B2 then  B1 for 6*m* **or** 9*g* **or** *T* = *am* + *bg* (where *a* ≠ 0 or 6and *b* ≠ 0 or 9) |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Total 3 marks** |

| 14 | (a) (i) |  | 5, 15 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (ii) |  | 5, 7, 9, 10, 11, 13, 15 | 1 | B1 |  |
|  | (b) |  | 4, 6, 8, 10, 12, 14 | 2 | B2 | B2 for all correct and none incorrect.  If not B2 then B1 for 4 or more correct and no more than 1 incorrect. |
|  |  |  |  |  |  | **Total 4 marks** |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Question** | | **Working** | **Answer** | **Mark** | **AO** | **Notes** | |
| **15** |  | 2 × 2 × 5 or 2 × 3 × 5 or 3 × 3 × 5 |  |  | AO1 | M1 | for one of 20, 30, 45 written as product of prime factors or |
|  |  | or two of |  |  |  |  | list of at least 3 multiples of any two of 20, 30, 45 |
|  |  | 20, 40, 60 … |  |  |  |  |  |
|  |  | 30, 60, 90 … |  |  |  |  |  |
|  |  | 45, 90, 105 |  |  |  |  |  |
|  |  | 2 × 2 × 5 and 2 × 3 × 5 and 3 × 3 × 5 |  |  |  | M1 |  |
|  |  | or all of |  |  |  |  |  |
|  |  | 20, 40, 60 , 80 … 180 |  |  |  |  |  |
|  |  | 30, 60, 90 … 180 |  |  |  |  |  |
|  |  | 45, 90, 105 … 180 |  |  |  |  |  |
|  |  |  | 180 | 3 |  | A1 | for 180 or 2 × 2 × 3 × 3 × 5 oe |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **16** | (a) |  |  | 2 | M1 4*n* + *k* (*k* may be zero) |
|  |  |  | 4*n* + 1 | A1 oe eg. 5 + (*n* – 1)×4  **NB: *n* = 4*n* + 1 oe scores M1 A0** |
|  | (b) |  | 4*n* + 5 | 1 | B1 ft from (a) if (a) is of the form 4*n* + *k* oe  **NB: Accept 4(*n* +1) + 1 oe** |
|  |  |  |  |  | **Total 3 marks** |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Question** | | **Working** | **Answer** | **Mark** | **AO** | **Notes** | |
| **17** | **a** |  | triangle with  vertices | 1 | AO2 | B1 |  |
|  |  |  | (3, −1) (3, −4) (5, −4) |  |  |  |  |
|  | **b** |  | Rotation |  | AO2 | B1 |  |
|  |  |  | centre (−3, 0) |  |  | B1 |  |
|  |  |  | 90° anticlockwise | 3 |  | B1 | accept +90°, 270° clockwise, −270° |
|  |  |  |  |  |  |  | NB. If more than one transformation then no marks can be  awarded |

| 18 |  | 180 – 156 (=24) or 180(*n* – 2) = 156*n* oe or 90(2*n* – 4) = 156*n* oe |  |  | M1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | 360 ÷ “24” or (180 × 2) ÷ (180 – 156) or |  |  | M1 | complete method |
|  |  |  | 15 | 3 | A1 |  |
|  |  |  |  |  |  | **Total 3 marks** |

| **21** | (a) | *y*2 + 10*y* − 2*y* − 20 |  | 2 | M1 | for 3 correct terms out of 4  or for 4 correct terms ignoring signs  or for *y*2 + 8*y* + *c* for any non-zero value of *c*  or for ... + 8*y* − 20 |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | *y*2 + 8*y* − 20 |  | A1 | cao |
|  | (b) |  | 4*e*2*f*(5*e3f –* 4) | 2 | B2 | B1 for a correct but incomplete factorised answer with a minimum of 2 out of **4**, ***e*2** or ***f*** outside the bracket, ie  4*e*² (5*e*3*f*2 −4*f*), 4*f*(5*e*5*f* −4*e*2), *e*²*f*(20*e*3*f* – 16),  4*ef*(5*e*4*f* – 4*e*), 2e2f(10e3f – 8)  **or** 4*e*2*f*(a two term algebraic expression) |
|  |  |  |  |  |  | **Total 4 marks** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 22 | 85 x 2 x 36.6 (=6222)  “4208.35..” + “6222” (=10430.35..) | 10400 | 4 | M1 or x 36.62 ÷ 2 (=2104.17..)  M1  M1 dep on both previous method marks  A1 awrt 10400  (accept correct answers given in an alternative form eg. 1.04 × 104 ; 104 × 102)  **SC**: B2 for an awrt 7320 |
|  |  | |  | **Total 4 marks** |

| 23 |  | 0.82*x* = 25.83 or 82% = 25.83 |  | 3 | M1 | or for use of 0.82 in a calculation |
| --- | --- | --- | --- | --- | --- | --- |
| or × 100 |  |  | M1 |  |
|  | 31.5(0) |  | A1 |  |
|  |  |  |  |  |  | **Total 3 marks** |