| 1 |  |  | 78 | 1 | B1 | cao |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Total 1 mark** |

| 2 |  | |  | |  | | 1 | | | B1 | cao |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  | |  | |  | |  | **Total 1 mark** | | |

| 3 |  | |  | | 2 | | 1 | | | B1 | cao |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  | |  | |  | |  | **Total 1 mark** | | |

| 4 |  | |  | |  | | 1 | | | B1 | cao |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  | |  | |  | |  | **Total 1 mark** | | |

| 5 |  | |  | |  | | 1 | | | B1 | cao |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  | |  | |  | |  | **Total 1 mark** | | |

| 6 | (a) |  |  | 2 | B2 | for all correct frequencies  (B1 for 2 or 3 correct frequencies or 2, 3 or 4 correct tallies with no frequencies (or incorrect frequencies) or frequencies written as probabilities with 2, 3 or 4 correct numerators) |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) |  |  | 3 | B2 ft | For 4 correct bars ft from table (B1ft for 2 or 3 correct bars ft from table) |
|  |  |  |  |  | B1 | For clear labels for bars and linear scale starting at 0 oe  Condone bars of different widths |
|  |  |  |  |  |  | **Total 5 marks** |

| 7 | (a) |  |  | 1 | B1 | accept 0.43(333…)  or 43(.333…)% |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | e.g.  **or**  **or**  where *a* > 23 and *a* ≠ 30 |  | 2 | M1 |  |
|  |  |  |  |  | A1 | accept 0.76(666…) or 0.77  or 76(.666…)% or 77% |
|  |  |  |  |  |  | penalise incorrect notation once only |
|  |  |  |  |  |  | **Total 3 marks** |

| 8 | (a) |  | 14 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
| (b) |  | −19 | 1 | B1 |  |
|  |  |  |  |  |  | **Total 2 marks** |

| 9 |  |  | 26 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Total 1 mark** |

| 10 | (a) |  | 13*x* – 2*y* | 2 | B2  (B1 | accept – 2*y* + 13*x*  for 13*x* or – 2*y*) |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | 2*n* = 16 – 5 or 2*n* = 11 oe **or (**16 – 5) ÷ 2 |  | 2 | M1 | for a correct first step  **or** a correct calculation for *n* |
|  |  |  | 5.5 |  | A1 | for 5.5 or  or |
|  |  |  |  |  |  | **Total 4 marks** |

| 11 | (a) |  | 44 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
| (b) |  | 6 | 1 | B1 |  |
| (c) |  | 36 | 1 | B1 |  |
| (d) |  | 17 | 1 | B1 |  |
| (e) |  | 8, 76 | 1 | B1 | Must have both and no others |
|  |  |  |  |  |  | **Total 5 marks** |

| 12 |  |  | 20*cd* | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Total 1 mark** |

| 13 |  | eg 76% (25%) 7.66% (8%) 2.6% or (0.76) 0.25 (0.0766) 0.08 (0.026) | 0.026, 0.0766, 8%, 25%, 0.76 | 2 | M1 | All values written as % or all written as decimals or 4 values in correct order or all values in correct reverse order |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | A1 | Any form |
|  |  |  |  |  |  | **Total 2 marks** |

| 14 |  |  | *e*5 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Total 1 mark** |

| 15 |  | 0.3 × 30 (= 9) **or**  **or** **or** 0.333…+ 0.3(=0.63…) **or** 33.3…(%) + 30(%)oe (=63.3…)(%) |  | 3 | M1 | Allow 9 squares clearly indicated for 30% or 10 squares clearly indicated for |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | “9” and “10” or 19 shaded squares on diagram **or**  **or**  (1 – 0.63…)× 30 |  | M1 | Allow squares with crosses or other indication of ‘shading’ such as ‘*y*’ or ‘*b*’ |
|  |  |  | 11 | A1 |  |
|  |  |  |  |  |  | **Total 3 marks** |

| 16 | (a)(i) |  | Three different numbers less than or equal to 9 | 1 | B1 | cao e.g. 1, 2, 3 or 3, 6, 9 |
| --- | --- | --- | --- | --- | --- | --- |
|  | (a)(ii) |  | Three different multiples of ten | 1 | B1 | cao e.g. 10, 20, 30 or 20, 40, 60 |
|  | (b) |  | A cross at 0.5 | 1 | B1 | cao |
|  |  |  |  |  |  | **Total 3 marks** |

| 17 | (a) |  |  | 2 | B2 | B2 for all scores completed correctly. B1 for 6, 7, 8 or 9 scores completed correctly |
| --- | --- | --- | --- | --- | --- | --- |
| (b) |  |  | 1 | B1ft | oe ( or 0.83(33...) or 83.(33..)%)  ft from complete table |
| (c) |  |  | 1 | B1ft | oe Penalise incorrect notation once only  ft from complete table |
|  |  |  |  |  |  | **Total 4 marks** |

| 18 |  | |  | | 4*x* – *x*2 | | 1 | | | B1 |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  | |  | |  | |  | **Total 1 mark** | | |

| 19 |  |  | 6*p* | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Total 1 mark** |

| 20 |  |  | 12 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 8 | 1 | B1 |  |
|  |  |  |  |  |  | **Total 2 marks** |

| 21 |  |  | 8*y*² | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Total 1 mark** |

| 22 |  | 3, 7, 8, 8 and one of  4 or 5 or 6 |  | B3 | For a list of 5 correct numbers  (B2 for a list of 5 numbers with 2 of: median of 7, mode of 8, range of 5  B1 for a list of 5 or 6 numbers with 1 of:  median of 7, mode of 8, range of 5) |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  | **Total 3 marks** | |

| 23 | (c) | Two intersecting arcs with equal radius |  | 2 | M1 | For arcs that intersect within guidelines or correct equilateral triangle drawn without arcs |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Correct equilateral triangle with arcs | A1 |  |
|  |  |  |  |  |  | **Total 2 marks** |

| 24 |  | e.g.  **or**  **or** |  | 2 | M1 | for finding a common denominator with at least one fraction correct |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Shown |  | A1 | dep on M1, for a complete correct method leading to |
|  |  |  |  |  |  | **Total 2 marks** |

| 25 |  |  | 3(3*t* – 2) | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Total 1 mark** |

| 26 | (a) |  | Reflection*x* = 1 | 2 | B1 | for reflection with no mention of translate, rotate, enlarge, move |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | B1 | for *x* = 1 with no mention of a vector, angle or scale factor |
|  | (b) |  | Rotation about (0,0) 90° clockwise | 3 | B1 | for rotation with no mention of translate, reflect, enlarge, move |
|  |  |  |  |  | B1 | for 90° clockwise/270° anticlockwise/−90° with no mention of a vector, line of symmetry or scale factor |
|  |  |  |  |  | B1 | for (centre =) (0,0), accept origin or *O* with no mention of a vector, line of symmetry or scale factor  Do not accept  for centre |
|  |  |  |  |  |  | **Total 5 marks** |

| 27 | (a) |  | 2.84 × 109 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) |  | 0.000 25 | 1 | B1 |  |
|  |  |  |  |  |  | **Total 2 marks** |

| 28 |  | 8*x*² + 20*x* – 6*x*² + 9*x* | 2*x*² + 29*x* | 2 | M1 | 3 correct terms or all 4 terms condoning incorrect signs |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | A1 |  |
|  |  |  |  |  |  | **Total 2 marks** |

| 29 | (i) |  | 21, 27 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (ii) |  | 21, 23, 24, 25, 27, 29 | 1 | B1 |  |
|  |  |  |  |  |  | **Total 2 marks** |

| 30 | (b) | or or 5 + *n* ˗ 6 = 13 | 14 | 2 | M1 | Use of 1 rule of indices or a correct equation in *n* |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | A1 | Accept |
|  |  |  |  |  |  | **Total 2 marks** |

| 31 | (c) | *y* + *e* = *dx* oe **or** |  | 2 | M1 | for a correct first step |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | A1 | oe e.g. |
|  |  |  |  |  |  | **Total 2 marks** |

| 32 | (a) |  | 16*x*12*y*20 | 2 | B2 | B1 for an answer in the form *axnym*  with 2 correct from  *a* = 16, *n* = 12, *m* = 20 |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b)(i) | (*x* ± 9)(*x* ± 4) |  | 2 | M1 | for (*x* ± 9)(*x* ± 4)  **or** for (*x* + *a*)(*x* + *b*)  where *ab* = −36 or *a* + *b* = 5 |
|  |  |  | (*x* + 9)(*x* – 4) |  | A1 |  |
|  | (ii) |  | –9, 4 | 1 | B1 | ft from (b)(i) |
|  |  |  |  |  |  | **Total 5 marks** |

| 33 | (a) |  | 5*y*3(3*y* + 4*u*) | 2 | B2  (B1 | for 5*y*3(3*y* + 4*u*)  for 5*y*(3*y*3+ 4*uy*2)  **or** 5*y*2(3*y*2+ 4*uy*)  **or** *y*2(15*y*2+ 20*uy*)  **or** *y*3(15*y* + 20*u*)  **or** 5*y*3(…) where there is only one mistake in the brackets) |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | oe**or** oe**or** oe |  | 3 | M1 | for removal of fraction in a correct equation |
|  |  | e.g. **or** oe**or** |  |  | M1 | for terms in *x* on one side **and** numbers on the other side in an equation, allow correct rearrangement of their equation in the form *ax* + *b* = *cx* + *d* |
|  |  |  | 2.75 |  | A1 | (dep on M1) oe e.g. or |
|  |  |  |  |  |  | **Total 5 marks** |

| 34 | (c)(i) | 7*t* – 2*t* < 7 + 8 oe eg 5*t* < 15 oe | *t* < 3 | 2 | M1 | Terms in *t* on one side and number terms the other side – may be in an equation or the incorrect inequality sign or an answer of  *t* = 3 or eg *t* ≥ 3 |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | A1 | Must be a correct inequality given as answer |
|  | (ii) |  | open circle at *t* = 3 and a line with an arrow to the left | 1 | B1ft | Allow a line without an arrow if it reaches to at least −5, with an arrow it can be any length |
|  |  |  |  |  |  | **Total 3 marks** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Qn** | **Paper** | **Question** | **Mean score** | **Max score** | **Mean %** | **ALL** | **5** | **4** | **3** | **2** | **1** | **U** |
| **1** | 1F | Q04e | 0.91 | 1 | 91 | 0.91 | 0.99 | 0.97 | 0.91 | 0.73 | 0.56 | 0.14 |
| **2** | 1F | Q04a | 0.93 | 1 | 93 | 0.93 | 0.99 | 0.95 | 0.96 | 0.88 | 0.61 | 0.29 |
| **3** | 1F | Q04b | 0.89 | 1 | 89 | 0.89 | 0.98 | 0.91 | 0.88 | 0.74 | 0.57 | 0.36 |
| **4** | 1F | Q04c | 0.87 | 1 | 87 | 0.87 | 0.97 | 0.91 | 0.87 | 0.70 | 0.53 | 0.14 |
| **5** | 1F | Q04d | 0.72 | 1 | 72 | 0.72 | 0.95 | 0.79 | 0.62 | 0.34 | 0.13 | 0.07 |
| **6** | 2F | Q02 | 4.61 | 5 | 92 | 4.61 | 4.85 | 4.71 | 4.61 | 4.22 | 3.63 | 1.78 |
| **7** | 1F | Q15 | 2.47 | 3 | 82 | 2.47 | 2.90 | 2.77 | 2.44 | 1.57 | 0.65 | 0.00 |
| **8** | 2F | Q03 | 1.82 | 2 | 91 | 1.82 | 1.93 | 1.84 | 1.83 | 1.68 | 1.27 | 0.66 |
| **9** | 2F | Q07e | 0.89 | 1 | 89 | 0.89 | 0.97 | 0.92 | 0.87 | 0.76 | 0.61 | 0.44 |
| **10** | 1F | Q07 | 3.26 | 4 | 82 | 3.26 | 3.85 | 3.64 | 2.97 | 2.25 | 1.24 | 0.36 |
| **11** | 2F | Q01 | 4.32 | 5 | 86 | 4.32 | 4.83 | 4.51 | 4.17 | 3.49 | 2.55 | 0.99 |
| **12** | 2F | Q07d | 0.85 | 1 | 85 | 0.85 | 0.93 | 0.85 | 0.81 | 0.76 | 0.69 | 0.22 |
| **13** | 2F | Q04b | 1.53 | 2 | 77 | 1.53 | 1.85 | 1.62 | 1.34 | 1.03 | 0.67 | 0.44 |
| **14** | 2F | Q07c | 0.78 | 1 | 78 | 0.78 | 0.91 | 0.81 | 0.73 | 0.59 | 0.33 | 0.00 |
| **15** | 2F | Q04a | 2.19 | 3 | 73 | 2.19 | 2.78 | 2.40 | 1.91 | 1.17 | 0.54 | 0.22 |
| **16** | 1F | Q02 | 2.30 | 3 | 77 | 2.30 | 2.59 | 2.36 | 2.25 | 1.99 | 1.41 | 0.28 |
| **17** | 2F | Q09 | 2.99 | 4 | 75 | 2.99 | 3.54 | 3.13 | 2.73 | 2.16 | 1.36 | 0.44 |
| **18** | 1F | Q12a | 0.68 | 1 | 68 | 0.68 | 0.91 | 0.76 | 0.57 | 0.28 | 0.12 | 0.00 |
| **19** | 2F | Q07a | 0.76 | 1 | 76 | 0.76 | 0.88 | 0.75 | 0.67 | 0.63 | 0.64 | 0.22 |
| **20** | 2F | Q06ab | 1.48 | 2 | 74 | 1.48 | 1.68 | 1.44 | 1.47 | 1.28 | 0.95 | 0.55 |
| **21** | 2F | Q07b | 0.68 | 1 | 68 | 0.68 | 0.87 | 0.71 | 0.59 | 0.39 | 0.24 | 0.00 |
| **22** | 2F | Q16 | 1.69 | 3 | 56 | 1.69 | 2.47 | 1.84 | 1.15 | 0.48 | 0.14 | 0.00 |
| **23** | 2F | Q06c | 1.21 | 2 | 61 | 1.21 | 1.59 | 1.22 | 1.07 | 0.61 | 0.36 | 0.11 |
| **24** | 1F | Q16 | 1.14 | 2 | 57 | 1.14 | 1.75 | 1.20 | 0.73 | 0.28 | 0.03 | 0.00 |
| **25** | 2F | Q07g | 0.54 | 1 | 54 | 0.54 | 0.84 | 0.58 | 0.26 | 0.13 | 0.05 | 0.00 |
| **26** | 1F | Q14 | 2.21 | 5 | 44 | 2.21 | 3.50 | 2.12 | 1.42 | 0.56 | 0.27 | 0.07 |
| **27** | 1F | Q22 | 0.85 | 2 | 43 | 0.85 | 1.45 | 0.81 | 0.41 | 0.17 | 0.03 | 0.00 |
| **28** | 2F | Q19a | 0.70 | 2 | 35 | 0.70 | 1.10 | 0.69 | 0.41 | 0.17 | 0.11 | 0.00 |
| **29** | 1F | Q20 | 0.65 | 2 | 33 | 0.65 | 1.03 | 0.66 | 0.38 | 0.17 | 0.04 | 0.00 |
| **30** | 2F | Q19b | 0.67 | 2 | 34 | 0.67 | 1.28 | 0.59 | 0.15 | 0.07 | 0.00 | 0.00 |
| **31** | 1F | Q12c | 0.67 | 2 | 34 | 0.67 | 1.29 | 0.50 | 0.23 | 0.06 | 0.00 | 0.00 |
| **32** | 1F | Q25 | 1.12 | 5 | 22 | 1.12 | 2.22 | 0.85 | 0.27 | 0.08 | 0.00 | 0.00 |
| **33** | 1F | Q21 | 1.09 | 5 | 22 | 1.09 | 2.19 | 0.71 | 0.30 | 0.17 | 0.03 | 0.00 |
| **34** | 2F | Q19c | 0.78 | 3 | 47 | 0.78 | 1.56 | 0.51 | 0.18 | 0.11 | 0.06 | 0.00 |
|  |  |  | **49.25** | **80** |  | **49.25** | **63.42** | **50.03** | **41.16** | **30.70** | **20.42** | **7.78** |

**Suggested grade boundaries**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Grade** | **5** | **4** | **3** | **2** | **1** |
| Mark | 58 | 45 | 36 | 25 | 15 |