|  |  |
| --- | --- |
| **GCSE Mathematics (9-1) Practice Tests**  | **Set 8 – Paper 3H mark scheme** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 1 |  | 2 , 20, 29 | 3 | M2 | for 3 number selected with at least two of the properties: mean = 17, median = 20, range = 27else M1 with one of these properties |
| A1 | in any order |

 **Alternative**

| 1 | 17 × 3 (= 51) | 2 , 20, 29 | 3 | M1 | method to find sum of 3 numbers |
| --- | --- | --- | --- | --- | --- |
| 17 × 3 – 20 (=31) | M1 | method to find sum of smallest and largest numbers |
| A1 | in any order |

 **Alternative**

| 1 | *x*, 20, *z*or *x*, *y* , *z* and *y* = 20 | 2 , 20, 29 | 3 | M1 | use of different letters with 20 shown as the middle value |
| --- | --- | --- | --- | --- | --- |
| *x* + *z* = 31 or oeor *z* – *x* = 27 or *x* – *z* = 27 | M1 | an equation for the sum or for the difference of the two unknown numbers |
|  | A1 | in any order |
| ***Total 3 marks*** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 2 | (a)(i) |  | 67 | 1 | B1 |  |
|  |  (ii) |  | reason | 1 | B1 | dep on B1or a fully correct method shown in (i)e.g. alternate angles are equalor other fully correct method |
|  | (b) | e.g. 180 – (67 + 60) or 120 – 67 or(180 – 67) – (180 – 120) or 113 – 60 or180 – 67 = 60 + y or 113 = 60 + y or 120 – y = 67 | 53 | 2 | M1 | Correct calculation for *y*  or correct equation in *y*,or *BFC* = 60° and *BCF* = 67°or *ABF* = 60° and *BCF* = 67°or *ABF* = 60° and *ABC* = 113° |
| A1 |  |
| ***Total 4 marks*** |
| 3 | (a) | (0 × 2) + 1 × 7 + 2 × 3 + 3 × 4 + 4 × 3 + 5 × 1(0 +) 7 + 6 + 12 + 12 + 5 | 42 | 2 | M1 | For at least 4 correct products with the intention to add. |
| A1 | SC B1 for 2.1 |
|  | (b) |  | 2 | 1 | B1 |  |
| ***Total 3 marks*** |
| 4 |  | × 8.50 or 0.06 × 8.50 or 0.51 or 51p | 9.01 | 3 | M1 |  | M2 for 1.06 × 8.50 oe |
| 8.50 + “0.51” | M1 | dep |
| A1 |  |
| ***Total 3 marks*** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 5 | (a)P*A* |  | A correct enlargement in the correct position | 2 | M1 | Enlargment of given shape by SF 3 anywhere on grid or completely correct enlargement by SF 2 |
| A1 | Fully correct |
|  | (b) |  | Rotation(Centre) (0,0)90° clockwise oe | 3 | B1B1B1 | *O* or origin90°, 270° | If more than one transformation mentioned then no marks |
| ***Total 5 marks*** |
| 6 |  | 2240 ÷ 805 (=2.78(26).....) | 2 hrs 47 mins | 3 | M1 |  |
| “0.7826...” × 60 (= 46.95...) or“2.7826...” × 60 (= 166.95…) | M1 | Method to change “0.7826…” to minutes or “2.7826…” to minutes |
| A1 | cao |
| ***Total 3 marks*** |
| 7 | e.g. 7*x* = 4*x* – 13.5 or 7*x* – 4*x* = −13.5 or 7*x* + 13.5 = 4*x* or 4*y* – 7*y* = 54 | *x* = −4.5 *y* = −18 | 3 | M1 | For correctly eliminating *y* or *x* |
| e.g.*y* = 4 × “4.5”or 4*x* = “18” or7 × “4.5” *y* = 13.5 | M1 | dep on first M1For method to find second variable  |
| A1 | dep on first M1 for both answers |
| ***Total 3 marks*** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 8 | cos *A* = (=0.6142) or sin *B* = (=0.6142) | 142 | 4 | M1 | cos *B* =, sin *A* = |
|  or  | M1 |  |
| *A* = 52.1° or *B* = 37.9° | A1 | 52° - 52.1° or 37.9° - 38°**SC B1** If M0 M0 A0 award B1 for 52.1° or 37.9° not identified as *A* or as *B* |
| B1  | ft for an angle identified as *A* or *B*Correct bearing (142 – 142.1) |
| ***Total 4 marks*** |
|  |
| 9 |  |  | 27*a*6*b*12 | 2 |  B2  | fully correctB1 for 2 of the three terms correct in a product. |
| ***Total 2 marks*** |
| 10 |  |  or **and** 2*p* < 13 3 or or  **and**   |  | 3 | M2 | Correctly subtracting 3 from each part of the inequality or dividing each term by 2or (*p* =) 4 **and** (*p* =) 5M1 for one end correcte.g. **or**  or (*p* =) 4 **or** (*p* =) 5 |
| A1 | accept *p* $\geq $−4 and *p* < 5 |
| ***Total 3 marks*** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 11 |  | 10 − 3 | 7 | 2 | M1 | 10 and 3 identified |
| A1 |  |
| ***Total 2 marks*** |
| 12 | e.g.  or  or  | 4.6 | 4 | M1 | For clear intention to multiply all terms by 12 or a multiple of 12 or to express LHS as a single fraction or as the sum of a pair of fractions with a common denominator of 12 or a multiple of 12 |
|  or | M1 | Expanding brackets correctly in a correct equation. |
| 5*x* = 23 or 20*x* – 15*x* = 24 + 8 9 or20*x* – 15*x*  = 24 – 1 oe | M1 | For correct rearrangement of a correct equation with fractions cleared and terms in *x* isolated. |
| A1oe | dep on at least M1 |
| ***Total 4 marks*** |
| 13 |  | (1.4 × 109)÷ (3.5 × 107) or  | 40 | 2 | M1 | or for an answer equivalent to  where *n* is an integer,e.g. 4, , 4000,  |
| A1 | Accept  |
| ***Total 2 marks*** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 14 | (a) |  |  | 2 | B1 | For left branch correct0.57(142…) |
|  | B1 | For right branches correct0.44(4…), 0.55(5…) |
|  | (b) |      |  | 2 | M1 | ft their tree  |
| A1 | ft their tree for fractions less than 1 oe , 0.19(0476...) |
| ***Total 4 marks*** |
| 15 |  |  | 4 | M1 | For squaring both sides |
|  | M1 | For multiplying both sides by (*w* −2) |
|  or   | M1 | For isolating terms in *w* in a correct equation. |
| A1 | oe  |
| ***Total 4 marks*** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 16 | (a) | 15 ÷ (80 – 50) (= 0.5) | 28, 18 | 2 | M1 | correct method to find fd for interval  or one correct frequency for  or 0.5 shown correctly on fd axis (1cm = 0.1) or 10 small squares = 1 person oe |
| A1 | Both values correct |
|  | (b) | , ,  | Correct bars drawn | 2 | M1 | For method to find one correct frequency density.Accept one bar drawn with correct heightAccept 10 × 10 = 100 or 12 × 10 = 120 or 8 × 10 = 80 small squares. |
|  fd = 0.2 (height 2 cm) fd = 0.2 (height 2 cm) fd = 0.1 (height 1 cm) | A1 | Three bars with correct widths and heights |
| ***Total 4 marks*** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 17 | (a) | (2*x* + 1)(*x* + 3) – 2 × 3 (= 45) or(2*x* + 1)(*x* + 3) – 6 (= 45) | obtained correctly. | 2 | M1 | A correct unsimplified expression or equation for shaded area |
| 2*x*² + 6*x* + *x* + 3 – 6 =45 | A1dep | Convincingly arriving at given equation. Expansion of brackets must be shown (3 or 4 terms). |
|  | (b) |   | 3.45 | 3 | M1 | Correct substitution into the quadratic formula, allow one sign error in numbers and + instead of ; discriminant must not be simplified as far as 433 |
| M1 | dep on first M1for simplification of discriminant to  or  |
| A1 | dep on first M1 3.45(216…)Award A0 if negative root is not excluded. |
| ***Total 5 marks*** |
| 18 | 1000*x* = 278.7878...  10*x* = 2.7878.... | 100*x* = 27.8787… *x* = 0.2787… | correctly shown | 2 | M1 | Two appropriate equations selected for use. e.g. 1000*x* = 278.7878... and 10*x* = 2.7878... |
| 990*x*  = 276*x* =  | 99*x* = 27.6 | A1 | e.g.  or  must be shown |
| ***Total 2 marks*** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 19 |  or  oe |  | 3 | M1 | For a correct expression as one fraction or as two fractions with a common denominator  |
|  or  or  oe | M1 | Correct expansion of  and in a single correct fraction  |
| A1 | Accept  |
| ***Total 3 marks*** |
| 20 |  or  or  or   | 4 | 5 | M1 | For simplifying the LHS to a product or quotient of two single powers of 5 or for an equation with 125 and at most a single power of 5 on each side. |
|  or  or  | M1 | For simplifying both sides to a single power of 5 |
| e.g. 2*n*² − 5*n* – 12 (= 0) or 2*n*² − 5*n* = 12 | A1 | A correct quadratic equation in *n*, simplified to three terms in any position. |
| (2*n* + 3)(*n* – 4) (=0) or=  | M1 | A correct factorisation or correct substitution into the quadratic formula or correctly completing the square. |
| A1 | dep on correct quadratic equationAward A0 if negative root is not excluded. |
| ***Total 5 marks*** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| **21** | **½ side of square** = 11cos72 (= **3.3991**...) or11sin18**side of square** =  (= **6.7983**…) or or  | 9.89 | 4 | M1 | For a complete correct method to find a length identified asside of square or ½ side of square. |
|  **ht of triangular face** = 11sin72 (= **10.4616**…)or 11cos18 or **diagonal of base** =  (= **9.6143**…) or or **½ diagonal of base** =  (= **4.8071**…) or or  or or  | M1 | For complete correct method to find a length identified asheight of triangular face,or diagonal of base or½ diagonal of base |
|  or or  | M1 | A correct method to find *OP* |
| A1 | Allow 9.8 – 9.95**SC B1** If no other marks are scored, award B1 for 11sin72 seen. |
| ***Total 4 marks*** |

| Question | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| **22** |  oe or  oe | 16.5 | 4 | M1 | A correct method to find an angle in a triangle formed by two radii and a side of the pentagon. |
|  (= = 8.54(5)...) oe | M1 | A correct method to find arc length |
| 2 × 6.8 × sin36° or 2 × 6.8 × cos54° or or (=7.99(3)...) | M1 | indep A correct method to find length of chord |
| A1 | Allow 16.5 – 16.6 |
| ***Total 4 marks*** |
| **23** | 11.45, 11.55, 5.05, 5.15 | 1001 | 4 | M1 | For a correct upper or lower bound for either number |
| 11.55³ (=1540 (.798875…)) | M1 | Correct method to find upper bound for volume of box |
|  (=539 (.53429…)) | M1 | Correct method to find lower bound for volume of ball |
| A1 | dep on correct working Accept 1001 or answer in range [1001.26, 1001.34]  |
| ***Total 4 marks*** |

**Practice Tests Set 8 – Paper 3H**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **Edexcel averages:** | **Mean score of students achieving grade** |
| **Question** | **Skills tested** | **Mean score** | **Max score** | **Mean %** | **ALL** | **9** | **8** | **A / 7** | **6** | **5** | **C / 4** | **3** |
| Q01 |  | 2.15 | 3 | 72 | 2.15 |  |  | 2.35 |  |  | 1.19 |  |
| Q02ai |  | 0.85 | 1 | 85 | 0.85 |  |  | 0.89 |  |  | 0.70 |  |
| Q02aii |  | 0.31 | 1 | 31 | 0.31 |  |  | 0.31 |  |  | 0.15 |  |
| Q02b |  | 1.37 | 2 | 69 | 1.37 |  |  | 1.44 |  |  | 0.65 |  |
| Q03a |  | 1.73 | 2 | 87 | 1.73 |  |  | 1.86 |  |  | 1.41 |  |
| Q03b |  | 0.45 | 1 | 45 | 0.45 |  |  | 0.42 |  |  | 0.18 |  |
| Q04 |  | 2.68 | 3 | 89 | 2.68 |  |  | 2.78 |  |  | 2.39 |  |
| Q05a |  | 1.51 | 2 | 76 | 1.51 |  |  | 1.68 |  |  | 0.89 |  |
| Q05b |  | 2.08 | 3 | 69 | 2.08 |  |  | 2.15 |  |  | 1.44 |  |
| Q06 |  | 2.17 | 3 | 72 | 2.17 |  |  | 2.28 |  |  | 1.29 |  |
| Q07 |  | 2.34 | 3 | 78 | 2.34 |  |  | 2.69 |  |  | 1.29 |  |
| Q08 |  | 2.41 | 4 | 60 | 2.41 |  |  | 2.70 |  |  | 0.47 |  |
| Q09a |  | 1.47 | 2 | 74 | 1.47 |  |  | 1.58 |  |  | 0.87 |  |
| Q010 |  | 2.05 | 3 | 68 | 2.05 |  |  | 2.38 |  |  | 0.84 |  |
| Q11 |  | 1.08 | 2 | 54 | 1.08 |  |  | 1.03 |  |  | 0.41 |  |
| Q12 |  | 3.01 | 4 | 75 | 3.01 |  |  | 3.48 |  |  | 1.48 |  |
| Q13 |  | 1.68 | 2 | 84 | 1.68 |  |  | 1.80 |  |  | 1.29 |  |
| Q14a |  | 1.85 | 2 | 93 | 1.85 |  |  | 1.93 |  |  | 1.64 |  |
| Q14b |  | 1.62 | 2 | 81 | 1.62 |  |  | 1.88 |  |  | 0.92 |  |
| Q15 |  | 2.29 | 4 | 57 | 2.29 |  |  | 2.43 |  |  | 0.48 |  |
| Q16a |  | 1.17 | 2 | 59 | 1.17 |  |  | 1.31 |  |  | 0.34 |  |
| Q16b |  | 1.13 | 2 | 56 | 1.13 |  |  | 1.24 |  |  | 0.36 |  |
| Q17a |  | 1.27 | 2 | 64 | 1.27 |  |  | 1.61 |  |  | 0.15 |  |
| Q17b |  | 1.63 | 3 | 54 | 1.63 |  |  | 1.83 |  |  | 0.39 |  |
| Q18 |  | 0.77 | 2 | 39 | 0.77 |  |  | 0.72 |  |  | 0.07 |  |
| Q19 |  | 1.49 | 3 | 50 | 1.49 |  |  | 1.47 |  |  | 0.29 |  |
| Q20 |  | 1.78 | 5 | 36 | 1.78 |  |  | 1.12 |  |  | 0.06 |  |
| Q21 |  | 1.66 | 4 | 42 | 1.66 |  |  | 1.40 |  |  | 0.11 |  |
| Q22 |  | 1.75 | 4 | 44 | 1.75 |  |  | 1.65 |  |  | 0.14 |  |
| Q23 |  | 1.59 | 4 | 40 | 1.59 |  |  | 1.43 |  |  | 0.05 |  |
|  |  | **49.34** | **80** | **62** | **49.34** |  |  | **51.84** |  |  | **21.94** |  |

**Suggested Grade Boundaries based on peformance of students in Summer 2018**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **9** | **8** | **7** | **6** | **5** | **4** | **3** |
| 65 | 56 | 47 | 37 | 27 | 17 | 12 |