**Practice Tests Set 7 – Paper 3H mark scheme – Spring 2018**

| **Qn** | | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- | --- |
| **1** | (a) | 8.5 × 5 | 42.5 | 1 | B1 cao |
|  | (b) |  | 110° | 1 | B1 cao |
|  | (c) |  | Correct × | 2 | M1 bearing of 40° or at distance 4 cm  A1 correctly marked × |
| **2** | (a) |  | Salt: 60 grams  Sugar: 90 grams | 3 | M1 Salt:  × 150 OR Sugar:  × 150  A1 cao  A1 cao |
|  | (b) |  | 1.71 : 1 | 2 | M1 “90”+30 : “60”+10 OR Sugar = “90”+30 and Salt = “”60”+10 B1 ft  M1 120: 70 OR 12 : 7 OR 4 : 2.33  B1 cao |
| **3** | (i) |  | 22 × 5 | 3 | B1 for 22 × 5 oe or 20 |
|  | (ii) |  | 23 × 3 × 52 |  | B2 for 23 × 3 × 52 oe or 600  (B1 for any product using powers of 2 and 3 and 5 **or** at least 300, 600… **and** 40, 80, 120 …) |
| **4** | (a) |  | Correct box plot drawn | 3 | B1 for median (28), B1 for quartiles (20, 42), B1 for whiskers. |
|  | (b) |  | Two comparisons | 2 | e.g. range of men’s ages is smaller than women’s, median age greater than women’s, IQR of men’s ages smaller than women’s |
| **5** |  |  | Vertices at  (3, 2) (3, 4)  (4, 4) (4, 3) | 2 | B2  B1 for shape of correct size and orientation **OR**  a correct enlargement scale factor , centre (1, 3) |
| **6** |  | –4 × 2 + 3*k* = 7 | 5 | 2 | M1  A1 |
| **7** |  |  | 28 | 5 | M1 attempt to find radius or diameter of the circle  M1 finding radius or diameter of circle  M1 for finding area of circle or semi-circle  M1 for complete method  A1 cao |
| **8** |  |  | 3 | 3 | M1 for sight of 2800 × 1.025*n*; finding at least two correct interest payments  (i.e. 70 and 71.75)  M2 for an attempt to evaluate 2800 × 1.025*n*for at least two values of *n*  A1 cao |
| **9** |  |  |  | 4 | C1 correct expansion of brackets  C1 arrives at *n*2 – 2*n* – *n*2 + 4*n* – 4  C1 reduces to 2(2*n* – 3) or 4*n* – 6  C1 for conclusion |
| **10** |  | **or** |  | 4 | M1 Squaring both sides **or** clearing fraction |
|  |  | 3*ek*² = 5*m* + 2e |  |  | M1 Clearing fraction **and** squaring both sides |
|  |  | 3*ek*² − 2*e* = 5*m*  or −5*m* = 2*e* – 3*ek*² *e*(3*k*² − 2) = 5*m*or −5*m* = *e*(2 – 3*k*²) |  |  | M1 Isolating terms in *e* in a correct equation |
|  |  |  |  |  | A1 cao |
| **11** | (a) |  |  | 2 | C1 Initial cost, cost of travelling 0 miles |
|  | (b) |  |  |  | C1 Charge per km, cost per 1 km |
| **12** | (a) | f(*x*) =  f(0) = −1, f(1) = 4 | Shown | 2 | M1 Method to establish at least one root in [0, 1]  eg. (= 0) and f(0) (= –1), f(1) (= 4) oe  A1 Since there is a sign change there must be at least one root in 0 < *x* < 1 (as f is continuous) |
|  | (b) | or | Shown | 1 | C1 for at least one correct step and no incorrect ones |
|  | (c) |  | 0.246(09375)  or | 3 | M1  M1 for  A1 for 0.246(09375) or oe |
| **13** | (a) |  |  | 3 | M1 for *x*(*y* – 3) =4  M1 for *xy* = 4 + 3*x*  A1 cao |
|  | (b) |  | – | 3 | M1 correct expression for fg(*a*)  M1 correct equation where fraction has been removed  A1 cao |
| **14** |  |  | 2.4 g/cm3 | 5 | B1 for appropriate intervals for measurements  P1 for correct process to find upper bound  P1 for correct process to find lower bound  P1 explanation of correct process to find appropriate degree of accuracy  A1 cao |
| **15** |  |  | 6 |  | B1 for expression for Carma’s share  B1 for expression for Banu’s share  M1 for adding shares  A1 cao |
| **16** | (a) |  | 320 | 2 | M1 for sight of 1:4 or 4:1  A1 cao |
|  | (b) |  | 1 373 600 | 3 | M1 for sight of 1:8 of 8:1  M1 for 8 × 171700  A1 cao |
| **17** | (a) | −4**a +**2**b +** 8**a (=** 4**a +** 2**b)** | 2**a** + **b** | 2 | M1 A1 correct method to find in terms of **a** and **b** |
|  | (b) | 4**a** + 2**a + b** (= 6**a** + **b**) and  2**b** + 8**a** + 4**a** (=12**a** + 2**b**)  **or**  4**a** + 2**a + b** (= 6**a** + **b**) and  **b** + 2**a** + 4**a** (= 6**a** + **b**)  **or**  2**b** + 8**a** + 4**a** (= 12**a** + 2**b**)and  **b** + 2**a** + 4**a** (= 6**a** + **b**) |  | 2 | M1 Correct vectors for and or for  and or forand (need not be simplified) ft their from (a) |
|  |  |  | Show |  | A1 For  or or  oe  **and** there is a common point. |
| **18** | (a) | 5 × “2.5” or 5 × or = oe  or oe | 12.5 | 2 | M1 Correct expression for *RQ* or correct equation to give *RQ*.  ft their answer to (a) |
|  |  |  |  |  | A1 cao |
|  | (b) | 42.5 ÷ “2.5” or or or  or  oe | 17 | 2 | M1 Correct expression for *CD* or correct equation to give *CD*.  ft their *RQ*, if used.  ft their answer to (a) |
|  |  |  |  |  | A1 cao |
| **19** |  |  |  | 4 | M1 for finding expression for surface area as surface are for hemisphere plus circle  A1 *r =*  M1 for *π*  A1 cao |
| **20** |  |  | 31.1 | 5 | M1 for  M1 for 100 ÷ (0.5 × 8.4 × sin 40) (= 37.(041...))  M1 (dep on 1st M1) for substituting the appropriate figures into the cosine rule  e.g. 8.4² + 37.041² – 2 × 8.4 × 37.041 cos40°  M1 (dep on previous M1) for correct order of evaluation or (*c*² =) 965.(897...)  A1 31.07 – 31.1 |

**Suggested grade boundaries**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **9** | **8** | **7** | **6** | **5** | **4** |
| **Paper 1H** | **68** | **60** | **52** | **44** | **35** | **26** |
| **Paper 2H** | **72** | **62** | **52** | **42** | **32** | **22** |
| **Paper 3H** | **58** | **50** | **42** | **34** | **26** | **18** |
| **Total** | **198** | **172** | **146** | **120** | **93** | **66** |