**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 cmA1 correctly marked × |
| **2** | (a) |  | Salt: 60 gramsSugar: 90 grams | 3 | M1 Salt:  × 150 OR Sugar:  × 150 A1 caoA1 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 : 2.33B1 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 | M1A1 |
| **7** |  |  | 28 | 5 | M1 attempt to find radius or diameter of the circleM1 finding radius or diameter of circleM1 for finding area of circle or semi-circleM1 for complete methodA1 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 bracketsC1 arrives at *n*2 – 2*n* – *n*2 + 4*n* – 4C1 reduces to 2(2*n* – 3) or 4*n* – 6C1 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) oeA1 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) =4M1 for *xy* = 4 + 3*x*A1 cao |
|  | (b) |  | – | 3 | M1 correct expression for fg(*a*)M1 correct equation where fraction has been removedA1 cao |
| **14** |  |  | 2.4 g/cm3 | 5 | B1 for appropriate intervals for measurementsP1 for correct process to find upper boundP1 for correct process to find lower boundP1 explanation of correct process to find appropriate degree of accuracyA1 cao |
| **15** |  |  | 6 |  | B1 for expression for Carma’s shareB1 for expression for Banu’s shareM1 for adding sharesA1 cao |
| **16** | (a) |  | 320 | 2 | M1 for sight of 1:4 or 4:1A1 cao |
|  | (b) |  | 1 373 600 | 3 | M1 for sight of 1:8 of 8:1M1 for 8 × 171700A1 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**) and2**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 forand 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 × $\frac{27.5}{11}$ or $\frac{RQ}{5}$ = $\frac{27.5}{11}$ 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 oror  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 circleA1 *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** |