Bands 3 – 5 Problem Solving – Test 3 Answers

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| 1. | 10% of £240 = £24 5% of £240 = £1215% of £240 = £36The increase is not more than Jim asked for | 1 mark for 10% or 5% calculated1 mark for 15% calculated1 mark for correct conclusion | 3 |
| 2. |  | 1 mark for each point plotted correctly | 2 |
| 3. | 2x + x + 3 + 2 + (2x + 3) + (x + 2)= 6x + 10= 2(3x + 5) | 1 mark for attempt to write expression for perimeter1 mark for all sides included in expression1 mark for correctly simplifying1 mark for correctly factorised | 4 |
| 4. | 90 ÷ 3 = 30 cm diameterRadius + diameter + radius = 15 + 30 + 15 = 60 cm | 1 mark for diameter or radius calculated1 mark for adding lengths1 mark for correct answer | 3 |

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| 5. | Area of grass = ((17 – 28) x 9.5) – (2 x $π$ x 1.9²) = (14.2 x 9.5) – (2 x 3.61$π$) = 134.9 – 22.682… = 112.217701…112.217701… ÷ 12 = 9.35147…10 bags of fertiliser | 1 mark for area of rectangle1 mark for area of circle1 mark for area of grass1 mark for ÷ 12 seen1 mark for correct answer | 5 |
| 6. | $\sqrt{6^{2}-1.5^{2}}= \sqrt{36-2.25}= \sqrt{33.75}$ = 5.809475… = 5.8 m | 1 mark for 6 or 1.5 squared1 mark for $6^{2}-1.5^{2}$1 mark for correct answer to 1 decimal place | 3 |

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| 7. | 1.25 x 0.6 x 1.4 = 1.055% increase | 1 mark for at least 1 multiplier correct1 mark for multiplying 3 correct multipliers1 mark for 1.05 seen1 mark for correct answer | 4 |
| 8. | Fixed charge is £10Bill is cheapest less than 10 milesEd is cheapest more than 10 milesThey cost the same for 10 miles | 1 mark for correct answer1 mark for correct line segment drawn from (0, 0), intersecting Bill’s graph at (10, 20)1 mark for less than 10 miles comparison1 mark for more than 10 miles comparison | 4 |
| 9. | Lower bound of 141.4 = 141.35141.35² = 19979.822519980 is smallest number | 1 mark for LB of 141.41 mark for squaring LB1 mark for correct answer | 3 |
| 10. | Slice A = 100xSlice B = 10(10 – x)x  = 100x – 10x²Slice C = x(10 – x)(10 – x) = x(100 – 20x + x²) = 100x – 20x² + x³  | 1 mark for Slice A correct1 mark for expression for Slice B1 mark for Slice B correct1 mark for expression for Slice C1 mark for brackets expanded1 mark for Slice C correct | 6 |
| 11. | P(2 stars) = $\frac{4}{9}$ x $\frac{3}{8}$ = $\frac{12}{72}$P(2 hearts) = $\frac{3}{9}$ x $\frac{2}{8}$ = $\frac{6}{72}$P(winning) = $\frac{12}{72}$ + $\frac{6}{72}$ = $\frac{18}{72}$ = $\frac{1}{4}$1440 x £1 = £1440 income$\frac{12}{72}$ x 1440 x £1.50 = £360 loss$\frac{6}{72}$ x 1440 x £2 = £240£1440 – (£360 + £240) = £840 raised for charity | 1 mark for P(2 stars)1 mark for P(2 hearts)1 mark for adding together1 mark for correct answer oe1 mark for total made from scratch card sales1 mark for taking away stars prizes1 mark for taking away hearts prizes1 mark for correct answer | 7 |
| 12. | Coffee upper bound = 130.5 mlCup lower bound = 174.5 mlMilk upper bound = 21.5 ml130.5 + (2 x 21.5) = 173.5173.5 is less than 174.5 so Beryl’s cup will never overflow | 1 mark for each correct bound1 mark for adding liquid contents1 mark for 73.5 seen1 mark for correct conclusion | 6 |