Bands 5 – 7 Problem Solving – Test 2 Answers

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| 1. | a) 4 4 4b) Any combination where indices sum to 12 | 1 mark for each correct set of indices | 2 |
| 2. | 350 x 1000 ÷ 3600 = 97.2 m/s**or**108 x 3600 ÷ 1000 = 388.8 km/hThe peregrine falcon is the fastest when you convert km/h to m/s **or** m/s to km/h | 1 mark for x 10001 mark for ÷ 36001 mark for 97.2 seen**or**1 mark for x 36001 mark for ÷ 10001 mark for 388.8 seen1 mark for correct conclusion | 4 |
| 3. | ½ x 4.6 x 10.2 x sin B = 21sin B = 0.8951…B = 63.52650… | 1 mark for equation set up1 mark for sin B calculated1 mark for correct answer given to suitable degree of accuracy | 3 |
| 4. | $\sqrt{2500 ÷625}$ = √4 = 221 x 2 = 42 cm | 1 mark for 2500 ÷ 6251 mark for √4 or 2 seen1 mark for 21 x 21 mark for correct answer | 4 |
| 5. |  (x + 5)(x + 2) - x² = 31x² + 2x + 5x + 10 - x² = 31 7x + 10 = 31 7x = 21 x = 3 cm | 1 mark for equation set up for area1 mark for brackets expanded1 mark for 7x seen1 mark for correct answer | 3 |
| 6. |  2a(a + 1) = 122a² + 2a – 12 = 0 a² + a – 6 = 0(a + 3)(a – 2) = 0a = -3 or 2 (-3 not possible)Dimensions 🡪 2 x 2 | 1 mark for equation set up for large rug area1 mark for brackets expanded1 mark for simplified1 mark for factorised1 mark for solved1 mark for 2 chosen1 mark for correct answer | 7 |
| 7. | German marks were better because:* Higher minimum and maximum
* Smaller interquartile range so more consistent
* Higher average than French
 | 1 mark for medians plotted correctly1 mark for lower quartiles and upper quartiles plotted correctly1 mark for minimum and maximum plotted correctly1 mark for a correct comparison (only accept if in context of question) | 4 |

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| 8. | C α s³50 = k x 10³k = 0.05C = 0.05s³C = 0.05 x 5³ = £6.25 | 1 mark for proportion sentence written1 mark for C and s substituted1 mark for k calculated1 mark for s substituted1 mark for correct answer | 5 |
| 9. | cos A = $\frac{7^{2} + 7^{2} - 12^{2}}{2 x 7 x 7}$A = 117.9945… = 118°$\left(\frac{118}{360} x π x 7^{2}\right)-\left(\frac{1}{2} x 7 x 7 sin118\right)$ = 50.45746… - 21.63221…= 28.82524…= 28.825 cm² | 1 mark for cos A substitution1 mark for A calculated1 mark for area of sector calculations1 mark for area of triangle calculations1 mark for 28 seen1 mark for correct answer | 6 |
| 10. | x = m sin 45 = $\frac{\sqrt{2}}{2}$ my = n sin 45 = $\frac{\sqrt{2}}{2}$ nArea of square= $\left(\frac{\sqrt{2}}{2} m+ \frac{\sqrt{2}}{2} n\right)\left(\frac{\sqrt{2}}{2} m+ \frac{\sqrt{2}}{2} n\right)$= ½ m² + ½ mn + ½ mn + ½ n²= ½ (m² + n²) + mn | 1 mark for x in terms of m1 mark for y in terms of n1 mark for multiplying sides of square1 mark for correct answer oe (does not have to be in simplest form) | 4 |
| 11. | f(x) = x(x + 3)f(4) = 4 🡪 8 on graphf(2x) = 2x(x + 3) = 2x² + 6x | 1 mark for x(x + 3) seen1 mark for 4 substituted1 mark for x2 or f(2x) seen1 mark for correct answer oe | 4 |