

| MATHEMATICS 2 nd SAMs 2017 Unit 1 (Non-calculator) Higher Tier | Mark | MARK SCHEME Comments (Page 1) |
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| 1.(a) $1 - (0.5 + 0.18 + 0.27)$ $= 0.05$ (b) $0.18 + 0.27$ $= 0.45$ (c) 0.5×0.18 $= 0.09$ | M1 A1 M1 A1 M1 A1 6 | Accept equivalent answers (percentages or fractions) throughout. |
| 2.(a) - 6 (b) Six correct plots. Curve drawn. (c) Correct values <u>from their graph</u> . (d) Correct coordinates <u>from their graph</u> . (e) 'The scale on the y-axis'. | B1 B1 B1 B1 B2 B1 7 | FT 'their (2,-6)'. FT 'their plots'. Minimum must be at (a, b) with $0 < a < 1$ and $b < -11$. Answers should be -1.3 and 2.6, but readings must from their graph. B1 for each. Should be (0.67, -11.3), but readings must from their <u>curved</u> graph. Accept unambiguous wording. |
| 3.(a) False AND a counter example given. (b) True AND a statement that refers to both '(odd) ² being odd' AND 'odd \times odd being odd'. | E1 E2 3 | Accept any equivalent intention to refer to both facts OR a single statement to cover both. E1 for reference to one of the two facts. |
| 4. Use of $\frac{(2n-4)}{n} \times 90^\circ$ OR $180^\circ - \frac{360^\circ}{n}$ Pentagon: 108° Hexagon: 120° Isosceles triangle: $180 - 2 \times 69$ $= 42^\circ$ (Angle sum =) $90^\circ + 108^\circ + 120^\circ + 42^\circ$ $= 360^\circ$ Organisation and communication Accuracy of writing | M1 A1 A1 M1 A1 B1 OC1 W1 8 | Used with $n = 5$ OR $n = 6$. Sight of either 108 or 120 implies M1. |
| 5.(a) 2 (b) $y = -2$ (c) (3 , 7) | B1 B1 B1 3 | |
| 6.(a) 4.5×10^6 (b) 1.35×10^{-4} | B2 B2 4 | B1 for 0.45×10^7 or 4 500 000. B1 for 13.5×10^{-5} or (0)·000135 |

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| <p>7.(a) $0.4 \times x = 0.12$ $x = 0.3$ 0.6 on correct branch ('Snowdon – No') 0.3, 0.7, 0.3 and 0.7 on correct branches.</p> <p>(b) 0.6×0.7 $= 0.42$</p> | <p>M1 A1 B1 B1</p> <p>M1 A1</p> <p>6</p> | <p>FT consistent pairing for 'their 0.3' but not for use of 0.6 and 0.4. B0 if 0.5 used on all four branches.</p> <p>FT 'their values'.</p> |
| <p>8.(a) $8 - x = 3(5 - x)$ or $8 - x = 15 - 3x$ $2x = 7$ $x = 3\frac{1}{2}$ or $7/2$</p> <p>(b) $2a(3a - 4b)$</p> <p>(c) $(3x - 4)^3$</p> | <p>B1 B1 B1</p> <p>B2</p> <p>B1</p> <p>6</p> | <p>FT until 2nd error.</p> <p>Mark final answer.</p> <p>B1 for $2a(3a - \dots)$ or $2a(\dots - 4b)$ B1 for $2(3a^2 - 4ab)$ or $a(6a - 8b)$</p> <p>Do not accept with missing brackets.</p> |
| <p>9. Any 2 of the lines $x = -1$, $x + 2y = 8$ and $y = 2x + 1$ correct.</p> <p>Correct region shaded.</p> | <p>B2</p> <p>B1</p> <p>3</p> | <p>B1 for any 1 correct line. If $x = -1$ and $y = -1$ are both shown do not award a mark unless $x = -1$ is selected for the region or clearly labelled. CAO. Accept indication by 'shading out'.</p> |
| <p>10. $\frac{\Theta}{360} \times 2\pi r + 2r$ $\frac{\Theta}{360} \times 2\pi \times 4.5 + 2 \times 4.5 = 34$ $\Theta = \frac{25 \times 360}{9\pi}$ $\Theta = \frac{1000}{\pi}$</p> | <p>S1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>4</p> | <p>FT for the correct manipulation of their equation with r in two terms, equivalent level of difficulty.</p> |
| <p>11. Sight of the volume scale factor or 5^3 OR 0.2^3. (Number of ornaments =) $875 \div 125$ OR 875×0.008. $= 7$</p> | <p>B2 M1</p> <p>A1</p> <p>4</p> | <p>B1 for sight of 5 OR 0.2.</p> |
| <p>12. (a) $\sqrt[3]{\frac{125}{8}}$ (b) π^2</p> | <p>B1</p> <p>B1</p> <p>2</p> | |
| <p>13. (a) Frequency densities of 0.6, 4.4, 6, 6.8, 1.5 Histogram of their frequency densities drawn. (b) An attempt to add the areas of the bars. $(10 + 11 + 17 + 20 + 22) = 80$ Search for the median within the 502.5 – 505 group e.g. $502.5 + \frac{2}{20} \times 2.5$ $= 502.75(g)$</p> | <p>M2 A1 M1 A1 M1</p> <p>A1</p> <p>7</p> | <p>M1 for any 3 or 4 correct. Provided M1 awarded.</p> <p>CAO. FT 'their 80' provided a clear attempt made to add the areas of the bars.</p> |

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| 14. Rearranging equation to $x^2 + x - 1 = 0.5x + 1$ Line $y = 0.5x + 1$ drawn Solution of approximately -1.7 AND 1.2 . | M1 A1 A1 3 | A solution obtained using the formula gets M0A0A0. |
| 15. Numerator of $(2x + 7)(x + 3)$ Denominator of $(2x + 7)(2x - 7)$ $\frac{x + 3}{2x - 7}$ | B2 B2 B1 5 | B1 for $(2x \dots 7)(x \dots 3)$. B1 for $(2x \dots 7)(2x \dots 7)$. FT provided no more than 1 previous error and provided simplification required. |
| 16. (a) $4/20 \times 3/19$ $= 12/380$ ($= 3/95$) (b) Strategy $1 - P(MM) - P(DD) - P(WW)$ OR equivalent. $P(MM) = 10/20 \times 9/19$ or $P(DD) = 6/20 \times 5/19$ or $P(WW) = 4/20 \times 3/19$ or other non-replacement product. $1 - \{(10/20 \times 9/19) + (6/20 \times 5/19) + (4/20 \times 3/19)\}$ $= 248/380$ ($= 62/95$) | M1 A1 S1 M1 A1 A1 6 | For the idea, not notation. Accept missing brackets. Or alternative full calculation shown. Allow missing brackets if intention clear. ISW. Ignore incorrect cancelling. |
| 17. Horizontal translation to the left with the curve crossing the x -axis to the left of zero. $y=f(x+3)$ crossing the x -axis at -3 and -1 . Reflection about the x -axis. | B1 B1 B1 3 | FT their $y = f(x + 3)$. |