

## UNIT 1 (HIGHER TIER)

Methods Unit 1 Higher Tier June 2014	Mark	Comment																																				
<p>1. <math>a = 52^\circ</math>  <math>b = 128^\circ</math>  <math>c = 128^\circ</math>  <math>d = 40^\circ</math></p> <p><math>e = 88^\circ</math></p>	<p>B1  B1  B1  B1</p> <p>B1  5</p>	<p>FT their <math>b = c</math>  FT 92 – their <math>a</math>, or their <math>b - 88</math>,  or their <math>c - 88</math>, or <math>128 -</math> their <math>e</math></p>																																				
<p>2. Considering all possible outcomes, e.g. use of two-way table, or showing all possible totals, or (Game card A) 6 possible (ways or outcomes) AND (Game card B) 16 possible (ways or outcomes)</p> <p>Example:</p> <table border="1" style="margin-left: 20px;"> <tr> <td style="padding: 2px;">+</td> <td style="padding: 2px;">1</td> <td style="padding: 2px;">2</td> <td style="padding: 2px;">3</td> <td style="padding: 2px;">4</td> <td style="padding: 2px;">5</td> </tr> <tr> <td style="padding: 2px;">1</td> <td style="padding: 2px;">2</td> <td style="padding: 2px;">3</td> <td style="padding: 2px;">4</td> <td style="padding: 2px;">5</td> <td style="padding: 2px;">6</td> </tr> <tr> <td style="padding: 2px;">2</td> <td style="padding: 2px;">3</td> <td style="padding: 2px;">4</td> <td style="padding: 2px;">5</td> <td style="padding: 2px;">6</td> <td style="padding: 2px;">7</td> </tr> <tr> <td style="padding: 2px;">3</td> <td style="padding: 2px;">4</td> <td style="padding: 2px;">5</td> <td style="padding: 2px;">6</td> <td style="padding: 2px;">7</td> <td style="padding: 2px;">8</td> </tr> <tr> <td style="padding: 2px;">4</td> <td style="padding: 2px;">5</td> <td style="padding: 2px;">6</td> <td style="padding: 2px;">7</td> <td style="padding: 2px;">8</td> <td style="padding: 2px;">9</td> </tr> <tr> <td style="padding: 2px;">5</td> <td style="padding: 2px;">6</td> <td style="padding: 2px;">7</td> <td style="padding: 2px;">8</td> <td style="padding: 2px;">9</td> <td style="padding: 2px;">10</td> </tr> </table> <p>Conclusion, game card B has the better chance</p> <p>Look for:</p> <ul style="list-style-type: none"> <li>• clear organisation, ordered lists or tables</li> <li>• labels linking working and game cards</li> <li>• clear explanation in a conclusion</li> <li>• if used, correct notation for probability</li> </ul> <p>QWC2: Candidates will be expected to</p> <ul style="list-style-type: none"> <li>• present work clearly, with words explaining process or steps</li> </ul> <p><b>AND</b></p> <ul style="list-style-type: none"> <li>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer</li> </ul> <p>QWC1: Candidates will be expected to</p> <ul style="list-style-type: none"> <li>• present work clearly, with words explaining process or steps</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer</li> </ul>	+	1	2	3	4	5	1	2	3	4	5	6	2	3	4	5	6	7	3	4	5	6	7	8	4	5	6	7	8	9	5	6	7	8	9	10	<p>B3</p> <p>E1</p> <p>QWC 2</p> <p>6</p>	<p>Accept 6/25 and 16/25. No extra outcomes should be included, e.g. including numbers not on the spinners  <i>If card A list complete, accept stopping listing card B possibilities as soon as &gt;6 possible ways indicated correctly.</i></p> <p>B2 for at least 1 possible outcome indicated for each of the 4 numbers on card A AND at least 2 possible outcomes indicated for each of the 4 numbers on card B, OR for <b>all</b> possible outcomes for card B</p> <p>B1 for 1 way of scoring a number on card A AND 2 ways for a number on card B, OR <b>all</b> outcomes for card A</p> <p>The conclusion must be based on working, i.e. provided at least B2 previously awarded</p> <p>QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.</p> <p>QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar  OR  evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.</p> <p>QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.</p>
+	1	2	3	4	5																																	
1	2	3	4	5	6																																	
2	3	4	5	6	7																																	
3	4	5	6	7	8																																	
4	5	6	7	8	9																																	
5	6	7	8	9	10																																	
<p>3.(a) 18 or equivalent  (b) 12 or equivalent  (c) 9  (d) Numerator 0.06(0) or 1 correct step in calculation  Multiplying numerator and denominator by suitable multiple of 10 – for eliminating decimals, or correct (FT) evaluation as a decimal</p> <p style="text-align: center;">1/1000</p>	<p>B1  B1  B2  B1  B1</p> <p>B1</p> <p>7</p>	<p>Accept a product of factors  Accept a product of factors  B1 for sight of 3, or <math>\frac{1}{4} + 2\frac{3}{4}</math>, or <math>0.25 + 2.75</math></p> <p>FT depending on their numerator.</p> <p><i>These 1<sup>st</sup> 2 B marks are interchangeable  A final answer of 0.001 is awarded B1, B1, B0  CAO  (Example: <math>0.60/60 = 0.01</math> or <math>1/100</math> or <math>6/600</math> is awarded B0, B1, B0  <math>60/600</math> as a 1<sup>st</sup> stage is awarded B0, B0, B0</i></p>																																				



10.(a)(i) $4n + 3$ (ii) $-2n + 74$ (iii) $n^2 - 8$  (b) $3 \times 20^2 + 4$ $= 1204$	B2 B2 B2  M1 A1 8	B1 for $4n$ B1 for $-2n$ . Allow SC1 for $2n + 74$ B1 for $n^2$ , not $an^2$ where $a \neq 1$ , OR B1 for sight of second differences 2 Must clearly be $20^2$ not $(3 \times 20)^2$ CAO
11.(a) $2 \times 10^{10}$  (b) $7.3 \times 10^9$	B2  B2  4	B1 for $20 \times 10^9$ or $0.2 \times 10^{11}$ or similar attempt at standard form B0 for 20 000 000 000  B1 for $10^8(5 + 6.8 \times 10)$ or $73 \times 10^8$ or $0.73 \times 10^{10}$ or similar attempt at standard form B0 for 7 300 000 000 <i>If no marks in (a) &amp; (b) then SC1 for both answers correct but not in standard form</i>
12.(a) (i) $6x(2x + 3y)$  (ii) $(x + 10)(x - 10)$ (b) $(x + 2)(x - 7) (=0)$ $x = -2$ and $x = 7$	B2  B1 B2 B1 6	B1 for a correct partially factorised expression, OR for sight of $6x(2x \dots)$ or $6x(\dots + 3y)$  B1 for $(x \dots 2)(x \dots 7)$ Must be from factorised expression or equation FT from their pair of brackets
13.(a) Explains parallel with intersection y-axis at 3, e.g. 'same gradient with intersection at $(y=)3$ '  (b) Reflection (in x-axis) or perpendicular (through the origin) or change the sign of the y-coordinate	E1  E1  2	Must imply parallel and mention (vertical) translation Allow 'put the line up another 3 squares' Do not accept 'm=1, c=3' unless related to $y = x$ ,  Accept use of knowledge ' $m \times -1/m = -1$ ', or ' $m_1 \times m_2 = -1$ ' Do not accept 'diagonally downwards', 'opposite (direction)', or 'reversed (direction)', or 'swap the coordinates' Allow 'same but decreasing instead of increasing (as it is minus)', 'rotate $90^\circ$ (about the origin)', 'change the sign of one of the coordinates'
14.(a) 0.35 0.8 0.2 0.8 on the correct branches (b) $0.65 \times 0.2$ $= 0.13$	B2 M1 A1 4	B1 for any two correct entries. Accept fractions
15.(a) Correct region shaded (b) Correct region shaded (c) Correct region shaded	B1 B1 B1 3	Union of A and B All shaded except the intersection of A with B All except the non overlap region of A
16.  (a) $37^\circ$ Alternate segment theorem <b>and</b> isosceles triangle (b) $55^\circ$ (Isosceles triangle,) angle at centre twice angle at circumference	B1 E1 B1 E1 4	The E1 mark depends on the B1 or sight of a correct method. For E marks: Do not accept calculation  Or equivalent.  Or equivalent.
17. $30 \times 70 = 35 \times AC$ OR $30 \times (30 + 40) = 35 \times AC$ $AC = 60$ (cm) $AB = 60 - 35$ $= 25$ (cm)	M1 A1 m1 A1 4	May be within a calculation towards AB directly May be implied in further working FT for their AC provided M1 awarded

<p>18.(a)(i) Sketch of <math>y=x^2</math> symmetrical passing through the origin  (ii) Sketch of <math>y=1/x</math> in appropriate 2 quadrants with axes as asymptotes</p> <p>(b) Sketch of <math>y = 2^x</math> through (0,1), with 1 indicated on the y-axis or coordinate (0, 1) given</p>	<p>B1  B2  B2  5</p>	<p>Mark intention to be symmetrical passing through the origin  B1 for sketch in 1 quadrant with axes as asymptotes, or for 2 curves appropriately in both quadrants but not clearly with intention of axes as asymptotes  B1 for general shape, towards zero gradient for greater negative values of x, and rising for greater positive values of x, clearly through a point on positive y-axis</p>
<p>19.Substitution of (2, 26),  e.g. sight of <math>26 = k \times 2^2 + 3 \times 2</math>  <math>k = 5</math>  Equating <math>y = 0</math>, e.g. sight of <math>0 = kx^2 + 3x</math>  <math>x(5x + 3) = 0</math>  (0, 0) or <math>x = 0</math>  (-3/5, 0) or <math>x = -3/5</math> or equivalents</p>	<p>M1  A1  M1  m1  A1  A1  6</p>	<p>FT their k with <math>k \neq 0</math>, including 'k'  Extracting common factor, accept <math>x(kx + 3) = 0</math>  Must be from correct working  Accept <math>x = -3/k</math>. Not dependent on m1</p>
<p>20.(a) <math>(x + 7)^2 + 4</math></p> <p>(b) Attempt to use common denominator</p> $\frac{4(3x+2) - 5(5x-2) + 14}{20} \text{ or equivalent}$ $\frac{12x + 8 - 25x + 10 + 14}{20} \text{ or equivalent}$ $= \frac{32 - 13x}{20}$	<p>B2  B1  M2  A1  A1  7</p>	<p>B1 for a= (+)7, B1 for b = 4, only award B2 for <math>(x + 7)^2 + 4</math>  e.g. allow sight of all 3 fractions denominator 20 without change to numerators  M1 for 2 of the three terms correct.  May be expressed as separate fractions, or working without consideration of the denominator  Convincing step. FT from 1 error, i.e. M1.  Must be clearly implying +10 term rather than -10 from notation  Denominator must be seen  Must follow from correct working</p>
<p>21.Sight of <math>P(A^c) = 0.6</math>  <math>0.6 \times x = 0.48</math> OR <math>x = 0.48/0.6</math>  <math>x = 0.8</math></p>	<p>B1  M1  A1  3</p>	<p>FT their <math>1 - 0.4</math> incorrectly evaluated for M1 only, do not FT 0.4 for <math>P(A^c)</math>  CAO</p>