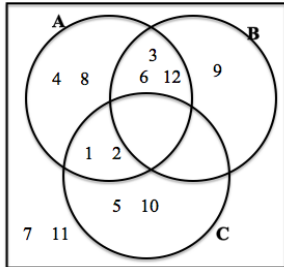


UNIT 1 (HIGHER TIER)

Methods Unit 1 June 2013 Higher Tier		Final																				
1. 42, 138, 42	B3 3	B1 for each correct answer. FT c = a or c = 180 - b																				
2. No AND reason (both the same) 1/6 No AND reason (1/6×1/6 =) 1/36	B2 B2 4	Accept NO with appropriate sight of 1/6. Accept refer to 1/6 in words. B1 for No AND reason implying both the same, i.e. 1/6 not given in the response, or sight of 1/6 with no conclusion or ‘Yes’ B1 for No AND reason maybe based on sample space, e.g. ‘No because there are more ways of getting it’ (without contradiction) or, gives 1/6×1/6 without stating 1/36, or,, gives 1/6×1/6 with an incorrect response, e.g. 2/36 or, sight of 1/36 with no conclusion Do not accept incorrect probability with statement ‘No’ without working																				
3. Venn diagram correct 	B4 4	No extra number >12 Mark unique placements of numbers, for duplicates mark the incorrect number then award as follows: B3 for any 9, 10 or 11 numbers correctly placed with no more than 1 extra number >12 B2 for any 6, 7 or 8 numbers correctly placed with no more than 2 extra numbers >12 B1 for any 3, 4 or 5 numbers correctly placed and ignore any extra numbers If no marks awarded SC1 for sight of sets A, B and C correct (including any extra numbers), shown in working or within Venn diagram																				
4.(a) Strategy to find at least one 4 th vertex, e.g. axes with 3 plots of given points and show understanding of parallel side requirement, OR a correct arithmetic method Any 2 of: (5, 6) (9, -2) (1, -2) (b) <table border="1" data-bbox="111 1373 721 1547"><thead><tr><th>Quadrilateral</th><th>Line symmetry</th><th>Diagonals perpendicular</th><th>Opposite angles equal</th></tr></thead><tbody><tr><td>(Kite)</td><td>1</td><td>Yes</td><td>No</td></tr><tr><td>(Isos. Trap.)</td><td>1</td><td>No</td><td>No</td></tr><tr><td>Rhombus</td><td>(2)</td><td>(Yes)</td><td>(Yes)</td></tr></tbody></table>	Quadrilateral	Line symmetry	Diagonals perpendicular	Opposite angles equal	(Kite)	1	Yes	No	(Isos. Trap.)	1	No	No	Rhombus	(2)	(Yes)	(Yes)	M2 A2 B3 7	M1 axes and plot the 3 points given, OR a reasonable attempt at an arithmetic method, OR axes and plot the 2 of the 3 points given with an attempt draw 2 appropriate parallel lines A1 for one correct, or for 2 indicated but coordinates not given or given incorrectly If one correct, this implies M2 (and A1) If no marks, award SC1 for evidence that the 3 coordinates have been reversed but a strategy to draw an appropriate parallel line is attempted. Do not penalise reverse coordinates if SC1 awarded. <i>Candidates clearly and consistently working with reverse coordinates should be penalised -1 only</i> B2 for any 5 or 6 correct entries B1 for any 3 or 4 correct entries				
Quadrilateral	Line symmetry	Diagonals perpendicular	Opposite angles equal																			
(Kite)	1	Yes	No																			
(Isos. Trap.)	1	No	No																			
Rhombus	(2)	(Yes)	(Yes)																			
5. <table border="1" data-bbox="111 1597 718 1742"><thead><tr><th>Fraction</th><th>Decimal</th><th>Recurring</th><th>Terminating</th></tr></thead><tbody><tr><td>2/5</td><td>0.4</td><td>No</td><td>Yes</td></tr><tr><td>5/8</td><td>0.625</td><td>No</td><td>Yes</td></tr><tr><td>7/9</td><td>0.77(777..) or 0.78</td><td>Yes</td><td>No</td></tr><tr><td>2/11</td><td>0.18(18..)</td><td>Yes</td><td>No</td></tr></tbody></table>	Fraction	Decimal	Recurring	Terminating	2/5	0.4	No	Yes	5/8	0.625	No	Yes	7/9	0.77(777..) or 0.78	Yes	No	2/11	0.18(18..)	Yes	No	B4 4	All correct B3 any 3 rows correct or all 4 decimals correct B2 any 2 rows correct or 3 decimals correct B1 any 1 row correct or 2 decimals correct <i>Accept unambiguous intention for Yes/No columns</i> <i>Accept if candidate indicates yes without giving the corresponding no, unless there is a contradiction, and vice versa</i>
Fraction	Decimal	Recurring	Terminating																			
2/5	0.4	No	Yes																			
5/8	0.625	No	Yes																			
7/9	0.77(777..) or 0.78	Yes	No																			
2/11	0.18(18..)	Yes	No																			
6. (1share is 60/4 =) 15kg Either 3×15 or 7×15 seen in working Jade 105 (kg) Bethan 45 (kg)	B1 M1 A2 4	FT their 60/4 incorrectly evaluated A1 for each correct response If answers reversed then, B1 M1 A1 SC1 if 60kg misinterpreted but then used correctly leading to correctly evaluated responses, 60/14 = 4.285... leading to 12.85... 17.14... and 30 (accept 13, 17 and 30)																				

7. An example of a tessellation covering a space having an element of a repeating pattern with at least one 360° point formed by using both of the shapes of tiles Use of angles at a point is 360° Shows sum to 360° including at least one 90° and at least one 60°	B2 B1 B1 4	B1 for an example of a tessellation covering a space with at least one 360° point formed by using both of the shapes of tiles. Accept sight of knowledge that angles at a point is 360° Accept if implied, e.g. '2 squares 180° and 3 (isosceles) triangles 180°'
8. (Sum of the three angles given is 300°) (Each of other two exterior angles is) $360 - 300 \div 2$ (Each of the other exterior angles is) 30° Use of 'interior angle + exterior angle = 180°' Interior angles 75°, 65°, 100°, 150°, 150° QWC2: Candidates will be expected to - present relevant work clearly, with words explaining process or steps AND - make few if any mistakes in spelling, punctuation and grammar QWC1: Candidates will be expected to - present work clearly which is mostly relevant, with words explaining process or steps OR - make few if any mistakes in spelling, punctuation and grammar and include units in their final answer	M1 m1 A1 M1 A1 QWC 2 7	FT their 300, sum of the three angles given FT their 300, sum of the three angles given CAO Or use of 'interior = $180 - \text{exterior}$' FT $180 - \text{their } 30$ provided M1 awarded OR Alternatively: (Use of interior angle + exterior angle = 180°) Interior angles 75°, 65°, 100° B1 Sum of the interior angles = $3 \times 180^\circ$ (= 540°) M1 Remaining interior angles = $540 - (75 + 65 + 100)$ m1 = 300° A1 Each of the remaining angles = 150° A1 <i>If no marks, SC1 for answers of 120° and 120° from incorrectly using 540° as exterior sum of the angles</i> 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. 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. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.

9. $180 \div 36 = 5$ and $180 \div 60 = 3$, OR $36 = 2 \times 2 \times 3 \times 3$, $60 = 2 \times 2 \times 3 \times 5$, and $180 = 2 \times 2 \times 3 \times 3 \times 5$, OR 36, 72, 108, 144, 180, ... with 60, 120, 180, ... HCF of 36 & 60 is $2 \times 2 \times 3$ or 12 Conclusion, e.g. 'this common factor of 12 is a factor of 180 so Jack is not correct (for this part of his statement)'	B1 B1 E1 3	Must <u>check</u> 1 st part of Jack's statement Depends on 2 nd B1
10.(a) (i) At least 2 correct points found or plotted Correct straight line shown (ii) At least 2 correct points found or plotted Correct straight line shown (b) No AND a reason, e.g. 'they don't intersect (meet) at 90° (right angles)'	M1 A1 M1 A1 E1 5	Do not accept 'No they are not perpendicular' FT provided one of their lines is correct Also FT provided one of their lines is correct, but then the incorrect line happens to be perpendicular, then 'Yes' with the reason 'intersect at 90°'
11.(a) $3t - 3g = hf - ht$ $3t + ht = hf + 3g$ $t(3 + h) = hf + 3g$ $t = \frac{hf + 3g}{h + 3}$ (b)(i) $10n - 7$ (ii) $-10n + 60$ or equivalent (iii) $2n^2 + 6$ or equivalent	B1 B1 B1 B1 B2 B2 B2 10	Incorrect expansions is 1 error FT until 2nd error Collection of t terms, or all negative Factorise t Division. Mark final answer B1 for sight of $10n$ For B2 mark final answer. B1 for sight of $-10n$ For B2 mark final answer. B1 for sight of $2n^2$ (or equivalent)
12.(a)(i) Correct sketch (ii) Correct sketch (b)(i) Correct sketch through (0,0) (ii) Sketch of any vertical translation Correct sketch with either (0,3) stated or 3 indicated on the y-axis (iii) Correct sketch through (0,0)	B1 B1 B1 B1 B1 B1 6	<i>Throughout this question mark intention in the 2 correct quadrants</i>
13. $2x^2 + 7x - 8x - 28 + x^2 + x + 4$ OR $2x^2 - x - 28 + x^2 + x + 4$ $3x^2 - 24 = 3(x^2 - 8)$, i.e. both steps shown	M2 A1 3	M1 if 1 slip or error CAO
14.(a) 5×10^3 (b) 2.4×10^9 (c) 3.36×10^8	B2 B2 B2 6	B1 for 0.5×10^4 or $\frac{1}{2} \times 10^4$ or 5000 B1 for 24×10^8 or 2 400 000 000 B1 for attempt to match addition of numbers, e.g. breaking down to $3.24 \times 10^7 \times 10$ or alternative strategy, or sight of 336 000 000
15.(a) 60 (b) 324	B2 B3 5	B1 for sight of $\sqrt{5} \times \sqrt{5} = 5$ B2 for $(3\sqrt{2})^4$ with an attempt to evaluate, $81 \times \dots$ or $\dots \times 4$, OR 18×18 B1 for $(3\sqrt{2})^4$ OR multiply pair brackets to 18
16.(a) $b = cd/a$ (b)(i) 90° or right angle Reason 'tangent meets radius (at 90°)' (ii) $2x$ x	B2 B1 B1 B1 B1 6	B1 for $a \times b = c \times d$ May be indicated on the diagram

17.(a) Sight of 6, 12, 18 (as winning tickets) or realising there are 3 winning tickets Idea to calculate $P(\text{win}) \times P(\text{win})$ $3/20 \times 2/19$ $6/380 (=3/190)$ (b) Sight of 1, 2, 3, 6, 9, 18 or realising that there are 6 winning tickets Considers $P(\text{win}) \times P(\text{win})$, $P(\text{win}) \times P(\text{lose})$, $P(\text{lose}) \times P(\text{win})$ $6/20 \times 5/19 + 6/20 \times 14/19 + 14/20 \times 6/19$ $(30/380 + 84/380 + 84/380)$ $198/380 (= 99/190)$	B1 S1 M1 A1 B1 S1 M1 A1 8	Accept from incorrect replacement idea FT their 3 if clear that an attempt to find multiples of 6 ISW OR $1 - P(\text{not winning})$. Accept from incorrect replacement idea FT their factors, provided clearly shown at least 4 of them OR $1 - 14/20 \times 13/19 (= 1 - 182/380)$ ISW
18.(a) $(x + 9)(x - 9)$ $(2x - 5)(x + 9)$ $\frac{x-9}{2x-5}$ (b)(i) $a = 6$ $x^2 + 12x + 36 (-22)$ OR method to find b $b = -22$ (ii) $(x + 6)^2 - 22 = 0$ $(x + 6)^2 = 22$ $x + 6 = (\pm)\sqrt{22}$ $x = \pm\sqrt{22} - 6$	B1 B2 B1 B1 M1 A1 B1 M1 M1 A1 11	B1 for $(2x \dots 5)(x \dots 9)$ FT if possible for similar level of difficulty Mark final answer, do not ISW Accept embedded answers Use of completing the square from (i), FT Must show $\pm$