APPLICATIONS UNIT 2
HIGHER TIER

Applications Unit 2 Higher Tier January 2014	Mark	Comment
1. Indicates: Mr Roberts, Miss Evans, Miss Abbott, Mr Brett	B2 2	Accept any unambiguous indication B1 for at least 3 correct and no more than 1 incorrect
2(a)(i) Suitable explanation demonstrating knowledge that the size must be increased to be identical (ii) Suitable explanation demonstrating knowledge that similar means same shape / angles, e.g. 'not the same shape', 'one is in italics' (b) States, e.g. 'turn around through half turn', 'turn upside down' (c) Use of either 5/7 or 7/8 5/7×7/8 5/8 (=35/56) or equivalent	E1 E1 E2 B1 M1 A1 7	e.g. ' double the size', 'enlarge' Do not accept if response implies that they must be the same size Accept 'Rotation (through) 180°' E1 for either turn / rotation or half turn / 180° Do not accept 'flipped' unless 2 appropriate stages are described Accept 0.625 Mark final answer If no marks, SC1 for (2/7 × 1/8 =) 2/56 or in decimals *Alternative:* *1 – (2/7 + 5/7 × 1/8) B1, M1*
3(a) Choice and reason, e.g. 'Michelle because of correlation', 'Michelle because no very short animals' (b) Line of best fit on Michelle's scatter diagram (c) Statement, e.g. 'Carl **not** correct as both the mode and the median are greater for girls' pets', 'Carl not correct as the mode for girls is greater and the range is not helpful'	E1 B1 B3 E1 6	Accept 'all close together' Appropriate direction with some points above and below the straight line B2 for 4 or 5 correct B1 for 2 or 3 correct *Ignore any extra calculations of the means.* Accept statement which includes the means Depends on previous award of at least B2 Statement must include reference to mode, or median (and range) Accept , for example 'Carl is not correct as the girls' mode is higher' Accept 'Carl is correct as the range is greater and the medians are similar', must refer to median **and** range
4(a) Use of ×48÷4 or ×12 OR realising 55g is 2oz (12 × 55) ÷110 × 4 OR 2 × 12 OR equivalent correct calculation 24 (ounces) (b) 150 fl oz = 150 × 25 (ml) (=3750 ml) 1 pancake 37.5/4 (= 9.375) ml water OR notices 3750 is 100 × amount given in the recipe (3750/9.375 OR 100 × 4 =) 400 (pancakes)	B1 M1 A1 M1 M1 A1 6	(2 oz for 4 pancakes, so 2 × 12) OR 3750÷37.5 = 100
5(a) 1220.18 ÷ 1.69 (= 722 (litres)) AND ÷ 4.55 (= 158.681319… (gallons)) AND × 42.9 6810 (miles) (b)Appropriate use of either 1 litre = $1000cm^3$ or $1m^3 = 1000000cm^3$ or $1m^3 = 1000$litres or similar 80 × 1000 ÷ 1000000 or 80 ÷ 1000 or equivalent 0.08 (m^3)	M3 A2 B1 M1 A1 8	Complete method ((1220.18÷1.69)÷4.55)×42.9 M2 for any 2 of the 3 operations suitable, other omitted or incorrect, OR M1 for 1220.18÷1.69, or 42.9÷4.55, or 4.55÷42.9, or 1.69×4.55 A marks depend on M3 A1 for 6807(.42857… miles) or correct from premature approximation

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6(a)(i) Age: Use of non-overlapping groups and no gaps in groups for ages Number of holidays: Use of non-overlapping groups and no gaps in groups given, or list of numbers to indicate (need not start at 0) Number of days: Use of non-overlapping groups and no gaps in groups not exceeding 365 days Type of holiday: List some types (perhaps with option for others), e.g. beach, city break, camping, activity, .. (ii) Reason, e.g. 'helps summarise', or 'smaller number of categories to manage', or 'can't list them all'	 B1 B1 B1 B1 E1	Throughout (a) at least 3 response groups or response options are needed as appropriate, any given groups must not overlap or have gaps
(b) (Value of insurance sales =) 6000 × 0.8 × 130 (£) 624000 (Number of customers claiming =) 6000×0.8×0.3(=1440) (Typical claim taken as £)450 (Amount paid out in claims 1440 ×450 = £) 648000 Loss and (£)24000 or –(£)24000 Look for • spelling • clarity of text explanations and/or labels • the use of notation (watch for the use of '=', £, % being appropriate) QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer	M1 A1 M1 B1 m1 B1 QWC 2 13	Must be a single value FT 'their 450' between 400 and 500 inclusive Do not accept 24000 FT provided M1, M1, m1 awarded Use of 400 gives 48000 profit, 500 gives 96000 loss, the final 3 marks are then B0, m1, B1 *If 400 & 500 (or 2 other extreme amounts)both considered and then summarised, with equivalent working then all of the final 3 marks may be awarded.* 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.

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7(a) 19225/(34400+3100) OR 12540/(26850+2760) 19225/(34400+3100) × 100 AND 12540/(26850+2760) × 100 June stated or implied AND With sight of 51(.2666… %) AND 42(.35… %) (b) $50000 – 3.2 \times 10^4$ or equivalent 1.8×10^4 (c) 24.3(0)×100/135 or 24.3(0)÷1.35 (£)18 (d) $1.7\times10^4 + 1.7\times10^4\times2 + 1.7\times10^4\times2\times2 + 1.7\times10^4\times2\times2\times2$ Or equivalent (£) 2.55×10^5	M1 m1 A1 M1 A2 M1 A1 B2 B2 12	A1 for 18000 OR $15 \times 1.7 \times 10^4$ B1 for sight of $1.7\times10^4\times2\times2\times2$ or equivalent for the 4th month B1 for 255000 or 25.5×10^4 or 2.5×10^5 from correct working
8(a) P = ns (b) Correct set up for eliminating one variable First variable's value Method to find second variable, FT from their first value Second variable's value	B1 M1 A1 m1 A1 5	Accept P = s×n Allow 1 error in the non equated variable g = 2 and h = 1/2 Award all 4 marks for unsupported correct answers
9.Sight of 305 (litres) Sight of 59.5 (seconds) 305/59.5 5.126 (litres/second)	B1 B1 M1 A1 4	 FT for their max litres (>300) / min time (<60) not 300/60 **Must be rounded to 3dp**

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10(a) Explains that 'interest is compounded'	E1	
(b)(i) (4.8 ÷ 12 =) 0.4%	B1	
(ii) 200×1.003^5	M1	
(£)203.02 or (£)203.01	A2	A1 for (£)203.01805… or 203 from compound working *Alternative method* *B1 for a correct 0.3% but not 3%* *M1 For the overall method (5 stages of adding <u>different</u> 0.3%).* *Accept inappropriate rounding or truncation for M1only, A0* *(Calculation:* *200* *<u>0.60</u>* *200.60* *<u>0.60(18)</u>* *201.20(18)* *<u>0.60(36054)</u>* *201.805405* *<u>0.60541622</u>* *202.410821* *<u>0.60723246</u>* *203.018053)* Do not ignore subsequent working, penalise -1 If no marks, then SC1 for Simple Interest (£)203.00
(iii)(F3=) (1 + D2 ÷ 100) × B2 or B2 × D2 ÷ 100 + B2 or equivalent	B2	<u>Accept / for division , * for multiplication and ^ for index</u> B1 for evidence of D2÷100, or D2×B2, or 1.012×B2, or 1.012×400 or equivalent B0 for 404.8(0)
(F14=) $(1 + D2 \div 100)^{12} \times B2$ or equivalent	B2	Accept cell E14 for indication of '12'. B1 for sight of power 12 linked to cell D2, or for $(1 + D2 \div 100)^x \times B2$, or (1+D2/100)^12*B2, or (1+D2/100)^E14*B2, or equivalent
	9	or for their formula for F3 with appropriate index provided equivalent difficulty
11(a) $r \geq 5$ and $c < 2r$ and $30r + 4c \leq 300$	B4	B3 for any 2 correct inequalities B2 for any 1 correct inequality with at least one other inequality only inaccurate due to incorrect symbol (>, ≥, <, ≤) B1 for any 1 correct inequality, **or** B1 for at least two inequalities only inaccurate due to incorrect symbol (>, ≥, <, ≤)
(b) Line r = 5 drawn correctly	B1	
Line c = 2r drawn correctly	B1	FT their inequalities if possible
Line 30r + 4c = 300 drawn correctly	B1	
The region indicated	B1	CAO
(c) 8 rugs and 15 cushions (giving 8×30 + 15×4)	M1	
(£)300	A1	FT their graph provided at least B2 in (b) 300 alone, without the number of rugs and cushions is M0, A0
	10	

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12. 5400 = ½ × 9.6 × … × 3(00) …. = (5400 × 2) ÷ (9.6 × 3(00)) or equivalent 3.75 (cm) hypotenuse^2 = 9.6^2 + 3.75^2 hypotenuse = √106.2(225) 10.3(… cm) Confirmation note completed: (9.6 cm), 3.8 (cm), 10.3(cm) and 300(.0 cm)	M1 M1 A1 M1 A1 A1 B1 7	Accept with 3 or 300 Rearrangement Accept 3.7, 3.8 or 4 FT from correct working FT 'their 3.75' provided at least M1 previously awarded Use of 3.7, 3.8, 4 gives 105.85, 106.6, 108.16 Use of 3.7, 3.8, 4 gives 10.288…, 10.32…, 10.4 FT provided all M marks awarded Accept 10.4 instead of 10.3 if FT from appropriate working. *N.B. Confirmation note must be completed for this B1, do not accept seen in working* *If no marks, SC1 for use of their height correctly within Pythagoras' Theorem*
13. Form and use a right angled triangle with base 55cm and height 50 cm Tan x = 50/55 42(°) or 42.3(°)	S1 M1 A3 5	 Or alternative FULL method A2 for 42.27….(°) A1 for tan^{-1} 0.909… or tan^{-1} (50/55)
14. Volume = volume outer cone– volume inner cone = 1/3 × π × 17^2 × 47 - 1/3 × π × 15^2 × 45 3.62 (litres)	S1 M2 A3 6	Accept for their incorrect volumes, but must come from 3D substitution M1 for 1/3 × π × 34^2 × 47 - 1/3 × π × 30^2 × 45 A2 for 3.619… (litres), 3.622…(litres), 3620 (cm^3) or FT from M1 to 14.5 (litres) A1 for answers between 3619 (cm^3) and 3622.7 (cm^3) inclusive or FT from M1 to 14.48(litres), 14.49(litres) or 14500(cm^3) *If no marks, SC1 for both volume expressions or use of 16 and 46 as appropriate within one volume expression*