

UNIT 1 - HIGHER TIER

Applications Unit 1 Higher Tier January 2013		Final
1.(a)(i) $3e + 2f$ (p)	B2	Allow $3 \times e + 2 \times f$ B1 for either $3e$ (or $3 \times e$ or $e \times 3$) or $2f$ (or $2 \times f$ or $f \times 2$) If B2, penalise further incorrect work -1
(ii) $\frac{3e + 2f}{100}$ or $0.03e + 0.02f$ (p) or equivalent	B1	Must clearly show ALL divided by 100. FT their (i) if a sum of 2 terms, equivalent difficulty
(b) $1000t$	B1	Allow $1000 \times t$ or $t \times 1000$
(c) $5x$	B1	Allow $5 \times x$ or $x \times 5$
(d) $14q^2$ (cm^2) or equivalent	B2	B1 for $\frac{1}{2} \times 4q \times 7q$
	7	If B2, penalise further incorrect work -1
2(a)		
Square Kite, Rhombus, Parallelogram	B2	B1 for any 3 unambiguous correct entries
(b)		
Square, Rhombus, Parallelogram Kite	B2	B1 for any 3 unambiguous correct entries
	4	
3(a) 255	B1	CAO
$51(578 + 5)$ OR $6y^3 + 15y$	M1	
$= 29733$	A1	CAO
Abby's code AND 1083	B1	CAO. Answer space not a contradiction. FT 1083 AND <u>all</u> their 4 digit codes selected
		If correct evaluation accept blank 'Abby's code' space
(b) 1369	B2	B1 for sight of 37
	6	
4(a) Reason, e.g. all different age groups	E1	Not marking choice 'yes' or 'no', marking understanding of cross-section of people asked. So could be, e.g. 'yes, as older people don't go to the cinema', or 'no, as all sorts of people go to the cinema'. Look for focus on age in response. Do not accept contradiction of choice yes or no with reason.
(b) Two boxes if you are 20 or refers to 'wide' group of older people	E1	Do not accept reference to age related ownership of MP3 Do not accept 'people not liking to give age', or 'lie about age', or 'not enough boxes' (as ambiguous)
(c) Suitable question with at least 3 boxes, no overlap or gaps (in pence) and prices from a low value upwards considered	E2	E1 for suitable question with at least 3 boxes, max of 1 overlap or 1 gap, must be suitable for amounts such as £19.99, i.e. pence considered as well as £s, OR E1 for prices from a low value upwards considered, minimum acceptable range $\approx$ £30 to $\approx$ £50
(d) Reason implying 'no' showing understand that repeating an experiment can lead to different results	E1	Accept 'no, as different people have different thoughts/amount to spend'
(e)(i) Reason implying no, such as: 'all columns total 20', 'all 60 answered', 'all people selected red, black or silver'	E1	Accept more complex answers. Do not accept reference to just 20 people
(ii) Strategy to use all data (for 60 people)	S1	
$12/60$ ($= 1/5 = 0.2$)	B1	
	8	Ignore incorrect cancelling of $12/60$. B0 for 12 out of 60, or 12 in 60, but either of these responses gets S1
5(a)		
120° drawn from Start	B1	Accept 'their North' provided $\pm 2^\circ$ from the North given.
040° drawn from the position of the first clue	B1	Penalise 'their North' outside of this tolerance once only
280° drawn from the position of the second clue	B1	$\pm 2^\circ$
Line 7.5cm OR 9cm OR 2.5cm for the appropriate stage	B1	$\pm 2^\circ$
Accurate chart with lengths and angles correct	B1	$\pm 2\text{mm}$
(b) 300°	B1	Within tolerances allowed
(c) Distance ($\pm 2\text{mm}$) from the position of the third clue to the start	B1	$\pm 2^\circ$. FT from their diagram
Bearing ($\pm 2^\circ$) from the position of the third clue to the start	B1	FT from their diagram
	8	(Actual is approximately $10.5 \times 40 = 420\text{m}$) FT from their diagram (Actual is approximately 250°)
6. $195/3$ ($=65$)	M1	OR sight of 130, (195,) and 325
$\times 10$	m1	OR sight of $130+195+325$
(£)650	A1	CAO
	3	

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7.(a)(i) Mid-points 52, 56, 60 and 64 $52 \times 12 + 56 \times 32 + 60 \times 14 + 64 \times 2$ (= 3384) /60 56.4 (ii) Strategy to look back that 32 out of 60 are size 2, e.g. 'table shows) about half customers are size 2 Conclusion to give Salesman is correct (b)(i) 242 235 229 (ii) Refers to 'smoothing out data', or 'giving a picture of a complete year's sales', or similar	B1 M1 M1 A1 M1 A1 B3 E1 10	FT their mid-points including bounds FT their $\Sigma fx/60$ Accept 56 from correct working seen Accept reference back to (a)(i) table without specific numeral details provided 'salesman correct' stated. B2 for any two correct entries, B1 for a correct method seen, or 1 correct entry Do not accept 'makes it clearer' Accept 'averages data out'
8(a) Valid reason or explanation, e.g. 'pond fits inside a rectangle' or 'pond fits inside a rectangle' or 'approximates to a rectangle' Sight of 6×20 (b) E.g. Considers 2 semi-circles and a rectangle Method of calculating area Accuracy in establishing missing lengths / dimensions Improved estimate QWC1 for a clear explanation of 'their idea' with generally accurate spelling Look for - relevance - spelling - clarity of text explanations, - the use of notation (watch for the use '=' being appropriate) - units - labelling 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 in their 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 in their final answer	S1 B1 S1 M1 M1 A1 QWC 2 8	Sight of the word rectangle. Needs to be precise in reference to rectangle, not vague referring to edges or banks of the pond being extra Idea of splitting up the area e.g. $\pi r^2 + l \times w$ e.g. Sight of diameter 6m or radius 3m AND length of rectangle $20 - 6 (= 14)m$, or $\pi \times 3^2 + 14 \times 6$ e.g. $112(.27... m^2)$ 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.(a) $6.8(408) \times 10^7$ (b) $5.43 \times 10^6 / 19$ or $5.43 \times 10^6 / 19 \pm x$ $\times 0.03$ $8.57(368...) \times 10^3 (m)$ or $8.6 \times 10^3 (m)$	B2 M1 M2 A1 6	B1 for 68408000 or $3.4(204) \times 10^7$ Ignore for some candidates realising 1 less gap for overall length, x is a small compensation value. M1 for $\times 3$ FT from M1, M1 but must be in standard form If division by 19.03 leading to $8.56(0168...) \times 10^3 (m)$ mark as above, i.e. allow M1, m2 but award A0 for this misinterpretation of the gaps as extra

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10(a) 40, 55, 60 (b) Correct cumulative frequency diagram, points plotted at bounds and joined by a curve or straight line (c) Median 17 (±0.5) Intention to subtract readings from horizontal axis for vertical 45 & 15 Interquartile range (12±1) (d) General idea of what box – whisker should be Range ends 37 and 2 correctly indicated Median line correctly indicated UQ and LQ correctly indicated (e) Strategy: use of median as same number above and below Interpretation: half free + half at £4 Conclusion based on appropriate working that no difference expected, i.e. compares with all at £2	B1 B2 B1 M1 A1 S1 B1 B1 S1 M1 A1 13	FT from cumulative (i) . Allow initial plot at the origin. B1 for points correct but not joined, OR B1 correct apart from 0.5 translation, OR B1 if one error in plotting but joined correctly FT from their cumulative diagram. Not cumulative no FT FT from their cumulative diagram. <i>Watch for an answer of 12 from LQ rather than interquartile range, must be IQR is (24-12 =) 12 if working shown</i> FT their median FT their UQ and LQ readings																				
11(a)(i) Idea: 6 × ... = 12 Height of 16 to 22 group indicated as 2 Correct uniform scale shown (ii) Method of summing width × height 59 (iii) Finding middle worker, i.e. 30 th value (or 29 ½ th) Realising within 12 to 16 interval 7 (or 6.5) out of the 24 in the group 13(.17seconds) or 13(.08 seconds) (b) Correct histogram on the graph paper provided (c) '40 and over' with a reason based on the shape of the histogram or the skew of the data	S1 B1 B1 M1 A1 S1 M1 M1 A1 B3 E1 13	3 correct values, no incorrect values is sufficient Must include at least 3 correct products. FT from their histogram with a uniform scale (6×0.5 + 4×5 + 4×6 + 6×2) CAO FT from their histogram with a uniform scale Must FT from histogram or either no working or correct working Do not accept an answer of 13 without working B2 for suitable uniform scale to at least 9, having worked with frequency density with at least 3 bars of the histogram correct B1 for working with frequency density, at least 3 calculations correct, OR sight of a uniform scale to 9 (not a scale to 36) Accept 'over 40s' with a suitable reason Accept 'over 40s, other median is 13 seconds where as median for these lies in 8 to 12 second group'																				
12(a) Correct evaluation of at least 3 coordinates Suitable axes with appropriate scale and labels Plotting at least 7 correct points (allow 2 slips) Joining all 9 points with a curve (b) (t =) 4 (seconds) (c) Strategy, e.g. to draw a tangent at t = 7 Use of difference v / difference t = ... m/s ² or ms ⁻² (d) Identifying the required area Splitting area into areas that can be approximated Complete calculation for the area required Accurately calculated	M1 A1 M2 A1 B1 S1 M1 A1 U1 S1 M1 M1 A1 14	<table><tr><td>t</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>v</td><td>0</td><td>7</td><td>12</td><td>15</td><td>16</td><td>15</td><td>12</td><td>7</td><td>0</td></tr></table> t= 0 to 8 and v = 0 to 16 (or 20). Must FT at least 3 correct points FT for their axes if reasonable. M1 for plotting between 3 and 6 correct points FT from their graph Accept appropriate other methods, e.g. close calculations to 7 Must be differences, not readings from axes. Ignore signs Reasonable from their graph. Must be negative (e.g. -6) Does not depend on previous marks Maybe shown on their graph (Possible answers include 80 (metres) using 2 triangles and 2 trapezia, or 84 (metres) using 2 triangles and 6 trapezia, 85.33... (metres))	t	0	1	2	3	4	5	6	7	8	v	0	7	12	15	16	15	12	7	0
t	0	1	2	3	4	5	6	7	8													
v	0	7	12	15	16	15	12	7	0													