

UNIT 1 (HIGHER TIER)

Applications Unit 1 Higher Tier June 2014	Mark	Comment
1(a) Reason, e.g. outside the bookshop	E1	Accept reference to people not buying, but checking out ready for downloading, 'showcasing', or that 'older people are more likely these days to buy from shops than younger people' Do not accept reference to groups under 20 and over 40.
(b) Two boxes if you are 30	E1	Or refers to widths groups for younger or older people, or unequal groups. Allow 'overlap(s)'. Ignore incorrect response if correct response is given. Do not accept 'doesn't give options for under 20s or over 40s', or '2 options for 20 year olds'
(c) Suitable question with at least 3 boxes, no overlaps or gaps and prices from a low value upwards (to maybe £20) considered or a number of boxes given but concentrated at lower prices	B2	B1 Suitable question with at least 3 boxes, with either consistent overlaps or gaps OR a suitable range of prices is not considered, OR B1 for suitable choice of groups with no gaps or overlaps but without a suitable question being asked <i>Examples of consistent overlaps or gaps:</i> '£0 - £5, £5 - £10, £10 - ...' 'under £5, £6 - £10, £11 - £15, £16 - ...' 'over £5, over £10, over £20'* <i>*however possible B2 if asked to tick only one box</i>
2(a)(i) $180 + 73$ or $360 - 107$ $= 253^{(o)}$ (ii) $360 - 42$ $= 318^{(o)}$	M1 A1 M1 A1	SC1 for answers of 073(°) and 138(°) in (i) and (ii)
(b) 60° with construction arcs (30° by) bisecting 'their angle', with arcs shown Correct 30° from appropriate construction with line shown at the right hand end of the line	M1 M1 A1 7	Accept anywhere on the line Allow sight of construction arcs for 60° Line (road) may not be shown Depends on both M marks
3(a) $7\text{cm} (\pm 0.2\text{cm}) \times 8 (\div 100)$ 0.56 (m)	M1 A1	Award M1 only for answers 56cm or 56m or 56 or similar from $\pm 0.2\text{cm}$ tolerance
(b) Measuring 2 appropriate angles ($\pm 2^\circ$) to check allied, or appropriate corresponding or alternate angles	B1	The size of angles may not actually be recorded, e.g. on diagram equal angles marked x and y. Accept references to the angles which are equal or sum to 180° (Angle at D & E appropriately $110^\circ \pm 2^\circ$ or $70^\circ \pm 2^\circ$, Angle at A & B appropriately $108^\circ \pm 2^\circ$ or $72^\circ \pm 2^\circ$)
Conclusion based on the angles measured and accurate knowledge of parallel line angle facts.	E1 4	Do not accept 'travelling in the same direction so won't meet'

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4(a) (Number of necklaces is) $918 \div 34$ = 27 (necklaces) (Number of yellow beads is $27 \times 10 =$) 270 (Number of black beads is $27 \times 6 =$) 162 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 (b) Deciding to make two bracelets 8 bags of purple beads 3 bags of green beads	M1 A1 B1 B1 QWC 2 B1 B1 B1 	

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6(a)(i) Total number of rotten apples considered 9 Total number of apples considered 100 9/100 or equivalent	B1 B1 B1	Allow $3/20+0/20+1/20+4/20+1/20$ leading to 9/100 as poor notation <i>Allow B2 for an answer of 1.8/20</i>
(ii) 8×9 or equivalent 72 (rotten apples)	M1 A1	FT their (i) $\times 8$ <i>M1 only for an answer of 72/..., e.g. 72/800</i>
(b) $2/24$ ISW ($=1/12 = 0.08333...$)	B2 7	B1 for appropriate sight of '2 apples' considered as a response or answers of $3/24 (= 1/8 = 0.125)$ or $4/24 (= 1/6 = 0.1666...)$
7(a) 240, 300, 345, 440	B3	OR B2 for any two correct entries, OR B1 for a correct method seen, or one correct entry
(b) Plots correct for their data at the mid interval with trend line drawn	B2	B1 for correct plots at mid interval, or consistent translated plots with trend line drawn
(c) Explanation, e.g. 'months not equal number of days', 'months about the same number of days'	E1	Accept 'yes' or 'no' depending on a reasonable explanation Allow 'NO, it makes it easier to plot with equal spaces', or 'NO, it still displays the data correctly' Do not accept 'YES, it gives inaccurate display', without an explanation of why
(d) 'NO', stated or implied with a suitable reason, e.g. 'will go down again as it gets to winter (autumn)', 'only rising as it now includes summer months', 'No in the long term as autumn and winter approach', 'no way of knowing'	E1 7	Accept YES with an appropriate reason, e.g. 'Yes in the short term as August has yet to be included'
8. Straight lines parallel to all verticals and horizontals, with lines of radius distance away from the steps ($\pm 2\text{mm}$)	B2	B1 for straight lines, or series of points (>6), parallel to 2 verticals/horizontals, radius distance away ($\pm 2\text{mm}$), OR straight lines parallel to all 6 verticals and horizontals but not radius distance away <i>Do not accept curves with free hand sketches</i>
All inner steps, locus turn at 90° vertex	B1	
All outer steps, arcs with wheel radius ($\pm 2\text{mm}$)	B2 5	B1 for arcs with wheel radius ($\pm 2\text{mm}$) at 2 outer steps, OR intention of arcs at all outer steps but not necessarily at wheel radius <u>If B5 penalise extra lines drawn -1</u>
9(a)(i) $(800 - 300)/50$ $= 10$	M1 A1	Or equivalent
(ii) Explanation, e.g. 'extra cost per person', '£10 per person', '£100 extra for every 10 people'	E1	Do not accept 'more people the more paid' FT from their gradient if reasonable
(iii) Explanation, e.g. 'fixed charge'	E1	Accept 'conference cost starts at £300', or 'hire cost'
(b) (£)200	B1 5	CAO

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10(a) 44, 76, 80 (b) Correct cumulative frequency diagram, points plotted at upper bounds and joined by a curve or straight line (c) <table border="1"><tr><td>Median</td><td>≈ 58 reading from graph</td></tr><tr><td>Low quartile</td><td>≈ 55.5 reading from graph</td></tr><tr><td>Upper quartile</td><td>≈ 61 reading from graph</td></tr><tr><td>Interquartile range</td><td>≈ 5.5</td></tr></table> (d) Range ends correctly indicated (50(cm) and 68(cm)) Median line correctly indicated (approx. 58) UQ and LQ correctly indicated (approx. 61 & 55.5)	Median	≈ 58 reading from graph	Low quartile	≈ 55.5 reading from graph	Upper quartile	≈ 61 reading from graph	Interquartile range	≈ 5.5	B1 B2 B1 B1 B1 B1 B1 B1 B1 B1 10	Accuracy: nearer the intersection of correct lines than any others FT only if cumulative in (a) 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 entries. Not cumulative means no FT. Accuracy of readings ±0.5 FT their UQ – their LQ correctly evaluated. Independent FT In (d) FT consistent previous misread of scale Whiskers should be shown If incorrect then FT their median If incorrect then FT their UQ and LQ readings						
Median	≈ 58 reading from graph															
Low quartile	≈ 55.5 reading from graph															
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11(a) Sight of $8(10 + x) - x^2$ or $8 \times 10 + x(8 - x)$ Convincing $80 + 8x - x^2$ (b) Finding at least two correct values for the area, either in working or plotted At least 4 correct plots All 6 points plotted accurately and joined with a curve (c) Either appropriate use of the graph or sight of $83.75 = 80 + 8x - x^2$ $x = 0.5$	M1 A1 M1 P1 C1 M1 A1 7	OR sight of appropriate areas, e.g. 8×10 , $8 \times x$ and $x \times x$ Must follow from correct working In (b) ignore any points $x > 5$ <table border="1"><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Area</td><td>80</td><td>87</td><td>92</td><td>95</td><td>96</td><td>95</td></tr></table> FT from their graph. Allow inclusion of 7.5 with the answer 0.5. <i>An answer of 7.5 only implies M1, A0</i>	x	0	1	2	3	4	5	Area	80	87	92	95	96	95
x	0	1	2	3	4	5										
Area	80	87	92	95	96	95										
12. <table border="1"><tr><td>$(8^{1/3} + 4^{-1/2})$</td><td>2.5</td></tr><tr><td>$2.3 \times 10^{-1} + 9^0$</td><td>1.2</td></tr><tr><td>$3\sqrt{125^2 + 12 \times 160000^{-1/4}}$</td><td>26</td></tr></table>	$(8^{1/3} + 4^{-1/2})$	2.5	$2.3 \times 10^{-1} + 9^0$	1.2	$3\sqrt{125^2 + 12 \times 160000^{-1/4}}$	26	B1 B1 B1 3	Allow 2.50 B0 for $0.23 + 1 = 1.23$, or 1.20 B0 for $25 + 0.6 = 25.6$, or 26.0 However if final 2 B marks are not awarded then SC1 for answers 1.23 and 25.6 respectively, or 1.20 and 26.0								
$(8^{1/3} + 4^{-1/2})$	2.5															
$2.3 \times 10^{-1} + 9^0$	1.2															
$3\sqrt{125^2 + 12 \times 160000^{-1/4}}$	26															
13(a) Method of finding 1 correct area 2 correct areas AND intention to add all areas 525 (b) $1 \times 75 + 4 \times 25$ (=175) $\times 200$ (£) 3.5×10^4 (c) No, stated or implied with a reason, e.g. ‘skew to offices greater than 80m^2 ’, ‘the median (300 th value) lies within the 100–125 interval’, ‘No, the majority are greater than 80m^2 (or 100m^2)’	M1 M1 A1 M1 m1 A2 E2 9	Areas are $4 \times 25 + 6 \times 25 + 7 \times 25 + 2 \times 50$ $= 100 + 150 + 175 + 100$ CAO. Answer of 600 by considering full area, is award M1, SC1 A1 for 35000 If no marks, then SC1 for ‘their 175’ $\times$ 200 correctly evaluated and expressed in standard form E1 for an answer that implies no with a statement implying that the median is greater than 80m^2 but without giving a reason why, OR E1 for NO with an incorrect median stated in the range $100 < \text{median} < 125$ without further statement <i>Do not accept reference to mode</i>														

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14(a) Approximate period: 24 to 29 (minutes) (b) Tangent drawn at $t = 35$ Method, difference y / difference x Evaluated answer from their reasonable tangent cm/min (c) $562 = \pi \times r^2$ $r = \sqrt{562/\pi}$ ($r = 13.37\dots$) $C = 2 \times \pi \times \text{their } r$ 80 (cm)	B1 B1 M1 A1 U1 M1 m1 M1 A2 10	Accept 25 to 30 (minutes) or 23 to 28 (minutes) Not necessarily from a tangent (May be approximately 0.2) Accept 'cm per min(ute)' FT their derived r A1 for 84.0...
15.(a) Finding the y values: (0,) 8, 7(, 0) Use of trapezium rule or splitting into the 3 areas required and attempt to sum Complete correct calculation for the area required 30 (m) (b) 'Under estimate' with reason suggesting that trapezium is beneath the curve	B1 M1 A1 A1 E1 5	May be shown on their graph FT their values for y (8 + 15 + 7) CAO Treat splitting area into 6 parts as MR-1, then follow the stages of the mark scheme