

Unit 1 Higher Tier: Statistics and Probability

5MB1H				
Question	Working	Answer	Mark	Additional Guidance
1.	(a)	$30 \leq a < 40$	1	B1 cao
	(b)	Points plotted at (25, 16), (35, 20), (45, 23), (55, 9), (65, 2) and joined with line segments	2	B2 complete polygon (ignore histograms and any lines below an age of 25 or above an age of 65), but award B1 only if there is a line joining the first to the last point (B1 one vertical or horizontal plotting error or incorrect but consistent error in placing the midpoints horizontally or correct plotting but not joined) Plotting tolerance: 1 (2 mm) square; points to be joined by lines (ruled or hand drawn, but not curves)
				<b>Total for Question: 3 marks</b>
2.		Easy Plane	6	M1 for $2 \times \text{Adult} + 3 \times \text{Child}$ M1 for using correct Adult and Child, i.e. (215, 128) or (211, 134) or (223, 119) A2 for 814, 824 and 803 (A1 for one or two correct or for a correct $2 \times \text{'Adult'} + 3 \times \text{'Child'}$ ) B1 for correct units, i.e. £ or pounds C1 for Easy Plane identified QWC: Decision must be stated and total costs must be attributable
QWC (i, ii, iii)		£803		
FE	$2(215) + 3(128) = 814$ $2(211) + 3(134) = 824$ $2(223) + 3(119) = 803$			
				<b>Total for Question: 6 marks</b>

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Question	Working	Answer	Mark	Additional Guidance	
3. QWC (i, iii)	Median (boys) = 45 Median (girls) = 50  Range (boys) = $65 - 22 = 43$ Range (girls) = $66 - 27 = 39$  IQR (boys) = $57 - 39 = 18$ IQR (girls) = $57 - 38 = 19$	Compares 1. medians 2. range/IQR	6	B2 for median (boys) = 45 and median (girls) = 50 (B1 for one correct median)  B2 for range (boys) = 43 and range (girls) = 39 OR IQR (boys) = 18 and IQR (girls) = 19 (B1 for one correct range/IQR) <b>OR</b> B2 for fully correct diagram/chart to compare, e.g. box plots, cumulative frequency diagrams, etc (B1 for diagram/chart with one error in presentation)  C1 for median (girls) > median (boys) oe or ft their medians or for range (boys) > range (girls) oe or ft their ranges or IQR (girls) > IQR (boys) oe or ft their IQRs C1 for comments relating to all working (ie range/median/charts dep on B4) QWC: Decisions should be justified, and calculations attributable  SC If no marks scored B1 for a correct comparison	
				<b>Total for Question: 6 marks</b>	
4.	(a)		Question + response boxes	2	B2 for a suitable question with at least 3 non-overlapping response boxes (must include a time period) (B1 for a suitable question with time period or non-overlapping response boxes)
	(b)		Reason	1	B1 for biased or all the students the same age or students (may) eat more sweets, etc
				<b>Total for Question: 3 marks</b>	

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Question	Working	Answer	Mark	Additional Guidance
5.	(a)(i)	Line of best fit	5	B1 for line drawn between (190, 80), (190, 95) and (210, 105), (210, 120)
	(ii)	1.25		M1 for diff. y / diff. x A1 for 0.5 – 2 or ft their line of best fit
	(iii)	practical interpretation		B2 for increase in kg per cm increase in height oe (B1 for a correct interpretation with only one or no units)
	(b)	40%	2	M1 for a horizontal line at 99 and a vertical line at 200 or for 2 seen A1 for 40% or $\frac{2}{5}$ or 0.4 oe
<b>Total for Question: 7 marks</b>				
6.		Scone 30g:10g:5g	4	M1 for $45 \div (6 + 2 + 1)$ A1 for SRF = 30, B = 10, C = 5 M1 for $200 \div 5$ or $500 \div 10$ or $2000 \div 30$ A1 cao
FE		$200 \div 5 = 40$ $500 \div 10 = 50$ $2000 \div 30 = 66.7$		OR  M1 for $6 \times 200$ or $2 \times 200$ or $1 \times 200$ or $6 \times 500$ or $2 \times 500$ or $1 \times 500$ or $6 \times 2000$ or $2 \times 2000$ or $1 \times 2000$ A1 for SRF, B, C = 1200, 400, 200 or 1500, 500, 250 or 2000, 666.7, 33.3 M1 for $(1200 + 400 + 200) / 45$ A1 cao
<b>Total for Question: 4 marks</b>				
7.	(a)	$1 - (0.15 + 0.1) = 0.75$	2	M1 for $1 - (0.15 + 0.1)$ or 0.75 seen A1 cao
	(b)		1	C1 for an appropriate correct explanation, e.g. you can't have 4.5 green counters or $9 \div 5$ is not a whole number, or that would mean there are 1.8 yellow counters
<b>Total for Question: 3 marks</b>				

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Question		Working	Answer	Mark	Additional Guidance
8.		$(120 \times 231 - 20 \times 236) \div 100$	230	3	M1 for $120 \times 231$ or $20 \times 236$ or 27720 or 4720 seen M1 for $(120 \times 231 - 20 \times 236) \div 100$ oe A1 cao
<b>Total for Question: 3 marks</b>					
9.		$3.02/100 \times 20000 \times 3$	(£)1812	6	M1 for a complete process, e.g. $3.02/100 \times 20000 \times 3$ or $1.0302 \times 20000 \times 3$ A1 for 1812 or 21812
QWC (ii, iii)		$20000 \times (1.0298)^3$	(£)1841.81		M2 for a complete process, e.g. $(1.0298)^3 \times 20000$ (M1 for $1.0298 \times 20000$ oe or 20596 seen) A1 for 1841.81 or 21841.81 seen
FE			Investment B		C1 for selecting the greater of '1812' and '1841.81' or '21812' and '21841.81' QWC: Decision must be stated with all calculations attributable
<b>Total for Question: 6 marks</b>					
10.		$0 \leq d < 10$ fd 0.5 $10 \leq d < 20$ fd 1.8 $20 \leq d < 25$ fd 3.0 $25 \leq d < 40$ fd 0.8 $40 \leq d < 60$ fd 0.5	Correct histogram	3	B2 for 5 correct histogram bars $\pm \frac{1}{2}$ square (B1 for 3 histogram bars correct)  B1 for frequency density label or key and consistent scaling
<b>Total for Question: 3 marks</b>					
11.	(a)		Correct explanation	1	C1 for all have equal chance of being selected
	(i)			1	C1 for groups in the sample are in the same proportion as they are in the population
	(ii)				
	(b)	$\frac{184}{850} \times 50$	11	2	M1 for $\frac{184}{850} \times 50$ or $\frac{184}{17}$ A1 cao
<b>Total for Question: 4 marks</b>					

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Question	Working	Answer	Mark	Additional Guidance
12.	$0.5 \times 5 + 0.25 \times 10 + 0.15 \times 20 + 0.1 \times 50 = 13$	14p	4	M2 for $0.5 \times 5 + 0.25 \times 10 + 0.15 \times 20 + 0.1 \times 50$ oe or for a consistent calculation for $n$ spins, e.g. $50 \times 5 + 25 \times 10 + 15 \times 20 + 10 \times 50$ where $n = 100$ (condone one error) (M1 for $0.5 \times 5$ or $0.25 \times 10$ or $0.15 \times 20$ or $0.1 \times 50$ oe) A1 for 13 or 14 A1 for 14p
<b>Total for Question: 4 marks</b>				
13.	$\frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{5}{8} = \frac{20}{72} + \frac{20}{72}$ <p>OR</p> $1 - \left[ \frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{3}{8} \right]$ $= 1 - \frac{32}{72}$	$\frac{40}{72}$	4	M1 for tree diagram with at most 2 errors or one of $\frac{5}{9} \times \frac{4}{8}$ or $\frac{4}{9} \times \frac{5}{8}$ or $\frac{4}{9} \times \frac{3}{8}$ or $\frac{20}{72}$ or $\frac{12}{72}$ or $\frac{5}{18}$ or $\frac{3}{18}$ oe M1 for any two of $\frac{5}{9} \times \frac{4}{8}$ , $\frac{4}{9} \times \frac{5}{8}$ , $\frac{4}{9} \times \frac{3}{8}$ or $\frac{20}{72}$ , $\frac{20}{72}$ , $\frac{12}{72}$ or $\frac{5}{18}$ , $\frac{5}{18}$ , $\frac{3}{18}$ oe M1 for $\frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{5}{8}$ oe or $1 - \left[ \frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{3}{8} \right]$ oe A1 for $\frac{40}{72}$ oe SC B2 for $\frac{40}{81}$
<b>Total for Question: 4 marks</b>				
14. QWC (ii, iii)	$\frac{4}{50} = \frac{50}{N}$ $(4 \times 12.5) / (50 \times 12.5) = 50/625$	625	4	M1 for $\frac{4}{50}$ oe or $\frac{50}{N}$ or 12.5 seen M1 for $(4 \times 12.5) / (50 \times 12.5)$ or an attempt to scale, i.e. $4 \times k / 50 \times k$ A1 for 625 C1 for a correct assumption, e.g. the population has not changed over night or the dye has not washed off or the returned sample has thoroughly mixed with the population or the sample is random, etc <b>QWC: Assumption must be stated clearly, in line with supporting calculations</b>
<b>Total for Question: 4 marks</b>				