Unit 1 Higher Tier: Statistics and Probability

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Question	Working	Answer	Mark	Additional Guidance
1. (a)		$30 \le a < 40$	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)
				Total for Question: 3 marks
2. QWC (i, ii, iii) FE	2(215) + 3(128) = 814 2(211) + 3(134) = 824 2(223) + 3(119) = 803	Easy Plane £803	6	M1 for 2 × Adult + 3 × 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 × 'Adult' + 3 × '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
				Total for Question: 6 marks

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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) OR 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
				Total for Question: 6 marks
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
				Total for Question: 3 marks

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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
				Total for Question: 7 marks
6. FE	Scone 30g:10g:5g 200 ÷ 5 = 40 500 ÷ 10 = 50 2000 ÷ 30 = 66.7	40	4	M1 for 45 ÷ (6 + 2 + 1) A1 for SRF = 30, B = 10, C = 5 M1 for 200÷5 or 500÷10 or 2000÷30 A1 cao OR M1 for 6 × 200 or 2 × 200 or 1 × 200 or 6 × 500 or 2 × 500 or 1 × 500 or 6 × 2000 or 2 × 2000 or 1 × 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
				Total for Question: 4 marks
7. (a)	1 – (0.15 + 0.1) = 0.75	0.25	2	M1 for 1 – (0.15 + 0.1) or 0.75 seen A1 cao
(b)		appropriate correct explanation	1	C1 for an appropriate correct explanation, e.g. you can't have 4.5 green counters or 9÷5 is not a whole number, or that would mean there are 1.8 yellow counters
				Total for Question: 3 marks

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Question	Working	Answer	Mark	Additional Guidance
8.	$(120 \times 231 - 20 \times 236) \div 100$	230	3	M1 for 120×231 or 20×236 or 27720 or 4720 seen M1 for ('120×231' – '20×236') ÷ 100 oe A1 cao
				Total for Question: 3 marks
9. QWC (ii, iii) FE	$3.02/100 \times 20000 \times 3$ $20000 \times (1.0298)^3$	(£)1812 (£)1841.81 Investment B	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 M2 for a complete process, e.g. $(1.0298)^3 \times 20000$ (M1 for 1.0298×20000 oe or 20596 seen) A1 for 1841.81 or 21841.81 seen C1 for selecting the greater of '1812' and '1841.81' or '21812' and '21841.81' QWC: Decision must be stated with all calculations attributable
				Total for Question: 6 marks
10.	$0 \le d <10$ fd 0.5 $10 \le d < 20$ fd 1.8 $20 \le d < 25$ fd 3.0 $25 \le d < 40$ fd 0.8 $40 \le d < 60$ fd 0.5	Correct histogram	3	B2 for 5 correct histogram bars ± ½ square (B1 for 3 histogram bars correct) B1 for frequency density label or key and consistent scaling
				Total for Question: 3 marks
11. (a) (i)		Correct explanation	1	C1 for all have equal chance of being selected
(ii)			1	C1 for groups in the sample are in the same proportion as they are in the population
(b)	$\dfrac{184}{850} \times 50$	11	2	M1 for $\dfrac{184}{850} \times 50$ or $\dfrac{184}{17}$ A1 cao
				Total for Question: 4 marks

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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 0.5×5 or 0.25×10 or 0.15×20 or 0.1×50 oe) A1 for 13 or 14 A1 for 14p
				Total for Question: 4 marks
13.	$\frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{5}{8} = \frac{20}{72} + \frac{20}{72}$ OR $1 - [\frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{3}{8}]$ $= 1 - \frac{32}{72}$	$\frac{40}{72}$	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 $1 - [\frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{3}{8}]$ oe A1 for $\frac{40}{72}$ oe SC B2 for $\frac{40}{81}$
				Total for Question: 4 marks
14. QWC (ii, iii)	$\frac{4}{50} = \frac{50}{N}$ $(4 \times 12.5)/(50 \times 12.5) =$ $50/625$	625 Assumption	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 QWC: Assumption must be stated clearly, in line with supporting calculations
				Total for Question: 4 marks