Mark scheme

Calculator Crossover Paper 6

40 marks · 45 minutes · Calculator

M = method mark A = accuracy mark (depends on M marks) B = independent mark C = communication
ft = follow through cao = correct answer only oe = or equivalent isw = ignore subsequent working

Q	Answer	Mark	Guidance
1(a) N4	$2^2 \times 3^2 \times 7^2$	**M1** **A1**	for at least two correct steps of a factor tree or repeated division, or 2, 2, 3, 3, 7, 7 listed for $2^2 \times 3^2 \times 7^2$ $2 \times 2 \times 3 \times 3 \times 7 \times 7$ scores M1 A0.
1(b)	All the powers are even, e.g. $1764 = (2 \times 3 \times 7)^2 = 42^2$	**C1**	for a correct explanation, e.g. every prime factor has an even power, or $1764 = (2 \times 3 \times 7)^2 = 42^2$ $\sqrt{1764} = 42$ with no reference to part (a) scores C0.
			Total for Question 1: 3 marks
2(a) N9	149 600 000	**B1**	cao
2(b)	4.99×10^2	**M1** **A1**	for $(1.496 \times 10^8) \div (3.0 \times 10^5)$ (= 498.66...) for 4.99×10^2 498.66... or 499 not in standard form scores M1 A0.
			Total for Question 2: 3 marks
3 R5	4.5	**M1** **M1** **A1**	for 11.7 ÷ 13 (= 0.9) for their 0.9 × 5, or for red = 3.6 and white = 8.1 for 4.5
			Total for Question 3: 3 marks
4(a) S2 S4	12.7	**B1**	cao
4(b)	3.1	**B1**	cao
			Total for Question 4: 2 marks

Q	Answer	Mark	Guidance
5(a) A22	$x \leq 2.6$	**M1** **A1**	for collecting terms correctly, e.g. $5x \leq 13$ for $x \leq 2.6$ oe, e.g. $x \leq \frac{13}{5}$ 2.6 with an incorrect or no inequality sign scores M1 A0.
5(b)	−1, 0, 1, 2, 3, 4	**M1** **A1**	for $-2 < n \leq 4$ oe, or for a list with at most one error or omission for −1, 0, 1, 2, 3, 4 and no others
			Total for Question 5: 4 marks
6(a) S6	Positive correlation	**B1**	for positive (ignore strength)
6(b)	170 (accept 166 to 174)	**M1** **A1**	for a single straight line of best fit with positive gradient passing between (150, 145) & (150, 153) and (185, 182) & (185, 190), or a vertical line drawn at 170 cm for an answer in the range 166 to 174
			Total for Question 6: 3 marks
7 P4	240	**M1** **M1** **A1**	for P(white) = 1 − (0.24 + 0.41) (= 0.35) for 84 ÷ their 0.35 for 240 cao
			Total for Question 7: 3 marks
8 R11	8.59	**M1** **M1** **A1**	for mass of copper = 240 × 8.96 (= 2150.4) or mass of zinc = 60 × 7.13 (= 427.8) for (2150.4 + 427.8) ÷ (240 + 60) (= 8.594) for 8.59 (8.96 + 7.13) ÷ 2 = 8.045 scores M0 M0 A0.
			Total for Question 8: 3 marks
9 R16	Account A, by £9.54	**M1** **M1** **A1** **C1**	for 3800 × 0.029 × 5 (= 551) or 3800 × 1.145 (= 4351) for 3800 × 1.027^5 (= 4341.46...) or 541.46... for 551 and 541.46 (or 4351 and 4341.46) for Account A by £9.54 (accept 9.53 to 9.54), ft their two values
			Total for Question 9: 4 marks

Q	Answer	Mark	Guidance
10 A19 A21	Adult £9.85, child £6.30	**M1** **M1** **A1** **A1**	for $4a + 3c = 58.30$ and $3a + 5c = 61.05$ for a correct method to eliminate one variable, e.g. $12a + 9c = 174.90$ and $12a + 20c = 244.20$ so $11c = 69.30$ for one correct value for both correct values (9.85 and 6.30) Trial and improvement leading to both correct values scores full marks.
			Total for Question 10: 4 marks
11 G20	Yes, $x = 72.8°$	**M1** **A1** **C1**	for $\cos x = \frac{1.6}{5.4}$ for $x = 72.76...$ (accept 72.7 to 72.8) for Yes, with their angle between 70° and 80° (ft their angle) Accept Pythagoras for the height (5.157...) followed by tan or sin for M1.
			Total for Question 11: 3 marks
12(a) G18	104.1	**M1** **A1**	for $\frac{135}{360} \times \pi \times 9.4^2$ (= 104.09...) for 104.1 (accept 104 to 104.1)
12(b)	40.9	**M1** **M1** **A1**	for $\frac{135}{360} \times 2 \times \pi \times 9.4$ (= 22.14...) for their arc length + 2 × 9.4 for 40.9 (accept 40.94 to 40.95) 22.1 (arc length only) scores M1 M0 A0.
			Total for Question 12: 5 marks