Mark scheme

Calculator Crossover Paper 4

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) N9	3.67×10^{-5}	**B1**	cao
1(b)	2.8×10^{10}	**M1** **A1**	for $28\,000\,000\,000$ or 2.8×10^{k} where $k \neq 10$, or 28×10^{9} for 2.8×10^{10}
			Total for Question 1: 3 marks
2(a) A4	$x^2 + 4x - 45$	**M1** **A1**	for 4 terms with at least 3 correct from $x^2 - 5x + 9x - 45$ for $x^2 + 4x - 45$ cao
2(b)	$5ab(3a - 2b)$	**M1** **A1**	for a correct partial factorisation, e.g. $5a(3ab - 2b^2)$, $ab(15a - 10b)$ or $5b(3a^2 - 2ab)$ for $5ab(3a - 2b)$
			Total for Question 2: 4 marks
3 R10	£67.86	**M1** **A1**	for $40.95 \div 7$ (= 5.85) or $11.6 \div 7$ (= 1.657...) for 67.86
			Total for Question 3: 2 marks
4(a) G13	A 3 cm by 2 cm rectangle with a line across it 1 cm from one of the 2 cm sides	**B2**	for a fully correct plan (any orientation) B1 for a 3 cm by 2 cm rectangle with no internal line or the line in the wrong place.
4(b)	The L-shape: 3 cm wide, 2 cm high on the left, stepping down to 1 cm high for the right-hand 2 cm	**B1**	for a correct front elevation
			Total for Question 4: 3 marks

Q	Answer	Mark	Guidance
5(a) G3	25	**M1** **A1**	for exterior angle = 180 – 165.6 (= 14.4) and 360 ÷ 14.4, or for 180(n – 2) = 165.6n for 25 cao
5(b)	No, with a reason, e.g. 360 ÷ 35 = 10.28..., which is not a whole number	**C1**	for No with a correct reason, e.g. 35 is not a factor of 360, or 360 ÷ 35 is not a whole number so the polygon would not have a whole number of sides
			Total for Question 5: 3 marks
6 R16	£1121.92	**M1** **M1** **A1**	for 1.036 or 5800 × 0.036 (= 208.8) as the first year's interest for 5800 × 1.036^5 (= 6921.92...), or a complete year-by-year method for 1121.92 6921.92 with no subtraction scores M1 M1 A0. Simple interest (5800 × 0.036 × 5 = 1044) scores M1 M0 A0.
			Total for Question 6: 3 marks
7 R11	104.5	**M1** **M1** **A1**	for converting the time, e.g. 1 hour 25 minutes = 85 minutes or 1.416... hours, or $1\frac{5}{12}$ hours for 148 ÷ 1.416... or 148 ÷ 85 × 60 (= 104.47...) for 104.5 (accept 104.47) 148 ÷ 1.25 = 118.4 scores M0 M1 A0.
			Total for Question 7: 3 marks
8(a) A22	$x > -4.5$	**M1** **A1**	for collecting terms correctly, e.g. $4x > -18$ or $4x + 18 > 0$ for $x > -4.5$ oe, e.g. $x > -\frac{9}{2}$ –4.5 with an incorrect or no inequality sign scores M1 A0.
8(b)	Open circle at –4.5 with an arrow (or line) to the right	**B1** **B1**	for an open circle at –4.5 for a line or arrow from –4.5 going to the right ft their inequality from (a).
			Total for Question 8: 4 marks
9(a) S6	As the temperature increases, the number of ice creams sold increases	**B1**	for a correct relationship in context (accept positive correlation)

Q	Answer	Mark	Guidance
9(b)	20 (accept 17 to 22)	**M1** **A1**	for a single straight line of best fit drawn with positive gradient passing between (14, 3) & (14, 9) and (28, 31) & (28, 37), or a vertical line drawn at 21 °C for an answer in the range 17 to 22
9(c)	5 °C is outside the range of the data (extrapolation)	**C1**	for a correct explanation, e.g. 5 °C is outside the range of temperatures recorded, or the line of best fit would give a negative number of ice creams
			Total for Question 9: 4 marks
10(a) P8	0.65 for No rain on Saturday; 0.35, 0.65, 0.35, 0.65 on the Sunday branches	**B1** **B1**	for 0.65 on the Saturday 'No rain' branch for 0.35 and 0.65 correctly placed on both pairs of Sunday branches
10(b)	0.455	**M1** **A1**	for 0.35 × 0.65 (= 0.2275) seen, ft their tree for 0.455 oe, e.g. $\frac{91}{200}$ 0.2275 on its own scores M1 A0.
			Total for Question 10: 4 marks
11(a) G17	72.6	**M1** **A1**	for $\frac{1}{2} \times \pi \times 6.8^2$ (= 72.63...) for 72.6 (accept 72.63) Using r = 13.6 (290.5...) scores M0 A0.
11(b)	35.0	**M1** **A1**	for $\frac{1}{2} \times \pi \times 13.6$ (= 21.36...) for 35.0 (accept 34.96) 21.4 (curved edge only) scores M1 A0.
			Total for Question 11: 4 marks
12 G20	7.5	**M1** **M1** **A1**	for $\sin 37 = \frac{x}{12.4}$ for $x = 12.4 \times \sin 37$ (= 7.462...) for 7.5 (accept 7.46 to 7.47) Using cos 37 (= 9.90...) scores M0 M0 A0.
			Total for Question 12: 3 marks