Mark scheme

Calculator Crossover Paper 8

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 R1	230 ml	**B1** **M1** **A1**	for 1.75 litres = 1750 ml, or 220 ml = 0.22 litres for 9 × 220 (= 1980) or 9 × 0.22 (= 1.98) for 230 (accept 0.23 litres if units clearly stated)
			Total for Question 1: 3 marks
2(a) N9	0.0094	**B1**	cao
2(b)	3.431×10^1	**M1** **A1**	for $9.4 \times 10^{-3} \times 3.65 \times 10^5$ (= 3431 cm) or 3431 ÷ 100 (= 34.31) for 3.431×10^1 (accept 3.43×10^1) 3.431×10^3 (in cm) scores M1 A0. Answer 34.31 not in standard form scores M1 A0.
			Total for Question 2: 3 marks
3 G1 G3	109°	**M1** **A1** **C1**	for angle ABC or angle ACB = (180 – 38) ÷ 2 (= 71) for 109 for appropriate reasons, e.g. base angles of an isosceles triangle are equal; angles in a triangle add up to 180°; angles on a straight line add up to 180° Alternative: exterior angle of a triangle equals the sum of the interior opposite angles, 38 + 71 = 109.
			Total for Question 3: 3 marks
4(a) A22	$x > 4.1$	**M1** **A1**	for collecting terms correctly, e.g. $2.5x > 10.25$ for $x > 4.1$ oe 4.1 or $x = 4.1$ on its own scores M1 A0.
4(b)	5	**B1**	for 5 (ft their answer to (a) if of the form x > k)
			Total for Question 4: 3 marks

Q	Answer	Mark	Guidance
5(a) A25	$2.8n + 1.8$	**M1** **A1**	for $2.8n + k$ where $k \neq 1.8$, or for $2.8n$ seen for $2.8n + 1.8$ oe
5(b)	102.6	**M1** **A1**	for $2.8n + 1.8 > 100$ or $(100 - 1.8) \div 2.8$ (= 35.07...), or for the 35th term = 99.8 or the 36th term = 102.6 for 102.6 An answer of 36 (the term number) scores M1 A0. ft their linear nth term from (a).
			Total for Question 5: 4 marks
6(a) S2 S4	Frequency polygon through (5, 4), (15, 11), (25, 17), (35, 12), (45, 6)	**B1** **B1**	for at least 4 points plotted correctly at the midpoints of the intervals, or all 5 points plotted at the correct heights at consistent non-midpoint values within each interval (e.g. at upper bounds) for all 5 points plotted correctly and joined with straight line segments Ignore any line joining (5, 4) to the horizontal axis or (45, 6) to the axis. Do not award the second B1 for bars drawn or for a line joining the first and last points.
6(b)	$20 < t \leq 30$	**B1**	for $20 < t \leq 30$ oe, e.g. 20–30
			Total for Question 6: 3 marks
7 R16	£933.01	**M1** **M1** **A1**	for 1.034 seen, or for 4200×0.034 (= 142.80) and 4200 + 142.80 (= 4342.80) for 4200×1.034^6 (= 5133.014...) or a complete year-by-year method for 933.01 (accept 933.00 to 933.02) 5133.01 (total value) scores M1 M1 A0. Simple interest, $4200 \times 0.034 \times 6 = 856.80$, scores M1 M0 A0.
			Total for Question 7: 3 marks
8 R5	175 kg	**M1** **M1** **A1**	for a correct method to find one part for any material, e.g. $50 \div 2$ (= 25) or $110 \div 4$ (= 27.5), or for the total for one material, e.g. 30×7 (= 210) for identifying sand as the limiting material, e.g. 30, 25 and 27.5 compared, or totals 210, 175 and 192.5 compared for 175 An answer of 210 (using all the cement) scores M1 M0 A0.
			Total for Question 8: 3 marks

Q	Answer	Mark	Guidance
9(a) P6	T only 29, T ∩ S 12, S only 18, outside 13	**M1** **M1** **A1**	for 13 placed outside both circles, or for 72 – 13 (= 59) seen for 41 + 30 – 59 (= 12) or 12 in the intersection for a fully correct Venn diagram
9(b)	$\frac{47}{72}$	**B1**	for $\frac{47}{72}$ oe (ft their Venn diagram)
			Total for Question 9: 4 marks
10 G20	Yes, $x = 29.8°$ (29.820...)	**M1** **A1** **C1**	for $\tan x = \frac{2.35}{4.1}$ oe, or for a full method using Pythagoras first (rope = 4.725...) then sin or cos for 29.8 (accept 29.8 to 29.82) for Yes with a correct angle in the range 25 to 35 (dep on M1) Finding the angle between the rope and the pole (60.2°) and then 90 – 60.2 is acceptable.
			Total for Question 10: 3 marks
11(a) A5 A2	$u = \sqrt{v^2 - 2as}$	**M1** **A1**	for $u^2 = v^2 - 2as$ for $u = \sqrt{v^2 - 2as}$ oe
11(b)	10.7	**M1** **A1**	for correct substitution, e.g. $\sqrt{14.2^2 - 2 \times 3.5 \times 12.6}$ or $\sqrt{113.44}$ for 10.7 (from 10.650...) 10.65... not rounded scores M1 A0 unless 10.7 also seen.
			Total for Question 11: 4 marks
12 G17 R1	16	**M1** **A1** **M1** **A1**	for $\frac{1}{3} \times \pi \times 3.2^2 \times 11$ for 117.9 to 118 (117.956...) for 2000 ÷ their volume (= 16.95...) for 16 cao An answer of 17 scores M1 A1 M1 A0. Using 2 instead of 2000 scores M1 A1 M0 A0.
			Total for Question 12: 4 marks