Mark scheme

Calculator Crossover Paper 5

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) N3	4.177454404...	**M1**	for $4.8^2 = 23.04$ or $\sqrt{27.5} = 5.244...$ or $2.36 + 1.9 = 4.26$, or 17.795... seen
		A1	for 4.177454404 (accept 4.177454 or better)
1(b)	4.18	**B1**	for 4.18, ft their answer to (a) if it has at least 4 significant figures
			Total for Question 1: 3 marks
2(a) N15	$2.35 \leq L < 2.45$	**B1**	for 2.35 in the correct place
		B1	for 2.45 in the correct place
			B1 for both values correct but in the wrong places.
2(b)	$7.6 \leq y < 7.7$	**B1**	for 7.6 in the correct place
		B1	for 7.7 in the correct place
			$7.55 \leq y < 7.65$ (rounding, not truncation) scores B0 B0.
			Total for Question 2: 4 marks
3 R9	6.5%	**M1**	for $\frac{24\,921 - 23\,400}{23\,400}$ (× 100) or $\frac{24\,921}{23\,400}$ (= 1.065)
		A1	for 6.5
			106.5 scores M1 A0.
			Total for Question 3: 2 marks
4 R1	1.275	**M1**	for 85 ÷ 4 (= 21.25 litres per minute) or 60 ÷ 4 (= 15)
		M1	for 85 × 15 (= 1275 litres) or 21.25 × 60
		A1	for 1.275 (accept 1.28 or 1.3)
			1275 with no conversion scores M1 M1 A0.
			Total for Question 4: 3 marks
5(a) P5	$\frac{85}{250} = 0.34$	**B1**	for 0.34 oe, e.g. $\frac{17}{50}$ or $\frac{85}{250}$
5(b)	204	**B1**	for 204, ft their (a) × 600

Q	Answer	Mark	Guidance
5(c)	Yes, with a reason	C1	for Yes with a reason, e.g. a fair dice would land on 6 about $\frac{250}{6} \approx 42$ times, and 85 is much more; or 0.34 is much greater than $\frac{1}{6}$ (0.166...)
			Total for Question 5: 3 marks
6(a) S4	1.77	M1 M1 A1	for at least 3 correct products of goals × frequency, e.g. 11, 18, 24, 16 for their total (69) ÷ 39 for 1.77 (from 1.769...) 69 ÷ 5 = 13.8 scores M1 M0 A0.
6(b)	2	B1	cao
			Total for Question 6: 4 marks
7 A5	$v = \frac{2s}{t} - u$	M1 A1	for a correct first step, e.g. $2s = (u + v)t$ or $\frac{2s}{t} = u + v$, or $2s = ut + vt$ for $v = \frac{2s}{t} - u$ oe, e.g. $v = \frac{2s - ut}{t}$ $v = \frac{2s}{t - u}$ with a correct first step seen scores M1 A0.
			Total for Question 7: 2 marks
8 R16	5901	M1 M1 A1	for 1.12 or 4200 × 0.12 (= 504) seen for 4200×1.12^3 (= 5900.6976) or a complete year-by-year method for 5901 (accept 5900.69... or 5900.7) Simple increase (4200 + 3 × 504 = 5712) scores M1 M0 A0.
			Total for Question 8: 3 marks
9(a) P6	G only 26, both 8, S only 17, outside 9	M1 A1	for 8 in the intersection, or for 34 + 25 + 9 – 60, or for a Venn diagram with 9 outside and the four regions summing to 60 for a fully correct Venn diagram
9(b)	$\frac{43}{60}$	M1 A1	for 26 + 17 (= 43), ft their Venn diagram for $\frac{43}{60}$ oe (accept 0.716... to 0.72)
			Total for Question 9: 4 marks

Q	Answer	Mark	Guidance
10 G16	285.6	**M1** **M1** **A1**	for $\frac{1}{2} \times (5.4 + 8.2) \times 3.5$ (= 23.8) for their area of the trapezium × 12 for 285.6 (accept 286) 5.4 × 8.2 × 3.5 × 12 or similar products of all lengths score M0 M0 A0.
			Total for Question 10: 3 marks
11 G20	37.2	**M1** **M1** **A1**	for $84^2 + 52^2$ (= 9760) for $\sqrt{9760}$ (= 98.79...) for 37.2 (accept 37.2 to 37.21) 98.8 on its own scores M1 M1 A0.
			Total for Question 11: 3 marks
12(a) A12 A14	−1, −5, −1	**B2**	for all three values correct B1 for one or two correct values.
12(b)	Smooth U-shaped curve through (−2, 4), (−1, −1), (0, −4), (1, −5), (2, −4), (3, −1), (4, 4)	**M1** **A1**	for at least 5 points plotted correctly, ft their table for a fully correct smooth curve
12(c)	−1.2 and 3.2	**B1** **B1**	for a value in the range −1.3 to −1.1 for a value in the range 3.1 to 3.3 Exact values are $1 \pm \sqrt{5} = -1.236...$ and 3.236... ft their graph.
			Total for Question 12: 6 marks