Mark scheme

Calculator Crossover Paper 1

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 N15	$14.65 \leq L < 14.75$	**B1** **B1**	for 14.65 or 14.75 in the correct position in an inequality for $14.65 \leq L < 14.75$ Accept $14.65 \leq L \leq 14.749...$ for B1 only. Accept x or any letter in place of L.
			Total for Question 1: 2 marks
2(a) A4	$5x + 3$	**M1** **A1**	for 3 out of 4 terms correct in $8x - 12 - 3x + 15$ for $5x + 3$ cao $8x - 12 - 3x - 15 = 5x - 27$ (sign error on -3×-5) scores M1 A0.
2(b)	$x^2 + 2x - 24$	**M1** **A1**	for 4 terms with 3 correct, e.g. $x^2 - 4x + 6x - 24$ for $x^2 + 2x - 24$
			Total for Question 2: 4 marks
3 R9	13.5% (13.461...)	**M1** **M1** **A1**	for $3245 - 2860$ (= 385) or $3245 \div 2860$ (= 1.1346...) for $\frac{385}{2860} \times 100$ oe, or $(1.1346... - 1) \times 100$ for 13.5 (accept 13.46 or 13.461...) $\frac{385}{3245} \times 100 = 11.9$ scores M1 M0 A0.
			Total for Question 3: 3 marks
4(a) N9	0.00064	**B1**	cao
4(b)	4.375×10^{10}	**M1** **A1**	for $(2.8 \times 10^7) \div (6.4 \times 10^{-4})$ or 43 750 000 000 seen for 4.375×10^{10} (accept 4.38×10^{10} or 4.4×10^{10}) Multiplying instead (1.792×10^4) scores M0 A0.
			Total for Question 4: 3 marks

Q	Answer	Mark	Guidance
5(a) P6	Gym only 35, both 12, Pool only 17, outside 16	**B1** **B1** **B1**	for 12 in the intersection for 35 in Gym only and 17 in Pool only (ft their intersection) for 16 outside both circles (ft their values, totalling 80)
5(b)	$\frac{16}{80}$ oe, e.g. $\frac{1}{5}$ or 0.2	**B1**	for $\frac{16}{80}$ oe (ft their Venn diagram)
			Total for Question 5: 4 marks
6(a) A22	$x > 3.25$ oe	**M1** **A1**	for collecting terms correctly, e.g. $4x > 13$ (or $4x = 13$) for $x > 3.25$ oe, e.g. $x > \frac{13}{4}$ An answer of 3.25 or $x = 3.25$ scores M1 A0.
6(b)	4	**B1**	for 4 (ft their answer to (a) if of the form $x > k$ with k not an integer)
			Total for Question 6: 3 marks
7 R16	£7372.79 (7372.7947...)	**M1** **M1** **A1**	for 1.032 seen, or 6500 × 1.032 (= 6708) as the value after 1 year for 6500×1.032^4, or a complete year-by-year method for 4 years for 7372.79 (accept 7372.79 to 7372.80) Simple interest: 6500 + 4 × 208 = £7332 scores M0 A0. Interest only (872.79) scores M1 M1 A0.
			Total for Question 7: 3 marks
8(a) S6	As the temperature increases, the number of hot chocolates sold decreases	**B1**	for a correct relationship in context, or negative correlation
8(b)	61 (accept 56 to 67)	**M1** **A1**	for a single straight line of best fit drawn passing between (6, 82) & (6, 94) and (24, 30) & (24, 40), or a vertical line at 15 °C for an answer in the range 56 to 67 Least-squares line gives 61.5 at 15 °C.
			Total for Question 8: 3 marks
9 R11	361 g (361.2672)	**M1** **M1** **A1**	for volume = 4.5 × 3.2 × 2.8 (= 40.32) for their volume × 8.96 for 361 (accept 361.2 to 361.3 if not rounded) Volume ÷ 8.96 (= 4.5) scores M1 M0 A0.
			Total for Question 9: 3 marks

Q	Answer	Mark	Guidance
10 S4	23.7 minutes (23.727...)	**M1** **M1** **A1**	for using midpoints 5, 15, 25, 35, 45 with at least 4 correct products (35, 210, 450, 385, 225) (dep) for their $\Sigma fx \div 55$, e.g. $1305 \div 55$ for 23.7 (accept 23.72 to 23.73) Using upper bounds consistently ($1580 \div 55 = 28.7$) scores M1 M0 A0. Dividing by 5 scores M1 M0 A0.
			Total for Question 10: 3 marks
11 G20	6.2 m (6.2457...)	**M1** **M1** **A1**	for $6.5^2 - 1.8^2$ ($= 42.25 - 3.24 = 39.01$) for $\sqrt{6.5^2 - 1.8^2}$ or $\sqrt{39.01}$ for 6.2 (accept 6.24 to 6.25) $\sqrt{6.5^2 + 1.8^2} = 6.74...$ scores M0 A0.
			Total for Question 11: 3 marks
12(a) A14 A11	3, –3, 3	**B1** **B1**	for 2 correct values for all 3 correct ($x = -1$: 3, $x = 1$: –3, $x = 4$: 3)
12(b)	Correct smooth curve through (–2, 9), (–1, 3), (0, –1), (1, –3), (2, –3), (3, –1), (4, 3)	**B1** **B1**	for at least 5 points plotted correctly (ft their table) for a fully correct smooth curve through all 7 points The minimum point is at (1.5, –3.25); a flat segment joining (1, –3) and (2, –3) loses the second B1.
12(c)	–0.3 and 3.3 (–0.302..., 3.302...)	**B1** **B1**	for an answer in the range –0.4 to –0.2 for an answer in the range 3.2 to 3.4 ft from their curve if within one small square.
			Total for Question 12: 6 marks