Mark scheme

Calculator Crossover Paper 10

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	2.06×10^6	**B1**	cao
1(b)	14 hours 46 minutes	**M1** **A1**	for $(3.84 \times 10^5) \div (2.6 \times 10^4)$ (= 14.769... hours) for 14 hours 46 minutes 14.77 hours, 14.8 hours or 14 hours 77 minutes scores M1 A0. 886 minutes (not converted) scores M1 A0.
			Total for Question 1: 3 marks
2 N15	$6.3 \leq L < 6.4$	**B1** **B1**	for $6.3 \leq L$ (or 6.3 and 6.4 in an inequality with incorrect signs) for $L < 6.4$ $6.25 \leq L < 6.35$ (rounding) scores B0 B0.
			Total for Question 2: 2 marks
3 R9	£89	**M1** **M1** **A1**	for 100 – 18 (= 82) or 0.82 seen for 72.98 ÷ 0.82 or 72.98 ÷ 82 × 100 for 89 (accept 89.00) 72.98 × 1.18 = 86.12 scores M0 M0 A0.
			Total for Question 3: 3 marks
4(a) A4	$2x^2 + 7x - 15$	**M1** **A1**	for 3 correct terms out of 4 from $2x^2 + 10x - 3x - 15$, or 4 correct terms ignoring signs for $2x^2 + 7x - 15$
4(b)	$(x - 4)(x - 5)$	**M1** **A1**	for $(x \pm 4)(x \pm 5)$ for $(x - 4)(x - 5)$
4(c)	$16a^{12}b^8$	**M1** **A1**	for two of 16, a^{12}, b^8 in a product for $16a^{12}b^8$ $8a^{12}b^8$ or $16a^7b^6$ scores M1 A0.
			Total for Question 4: 6 marks

Q	Answer	Mark	Guidance
5 R16	£13 776.75	**M1** **M1** **A1**	for 1.028 seen, or 12 000 × 0.028 (= 336) and 12 000 + 336 (= 12 336) for $12\,000 \times 1.028^5$ or a complete year-by-year method for 13 776.75 (accept 13 776.74 to 13 776.76) Simple interest, 12 000 + 5 × 336 = 13 680, scores M1 M0 A0. 1776.75 (interest only) scores M1 M1 A0.
			Total for Question 5: 3 marks
6 S4	25.52 minutes	**M1** **M1** **A1**	for 8 × 27.5 (= 220) or 12 × 24.2 (= 290.4) for (220 + 290.4) ÷ 20 oe for 25.52 (accept 25.5) (27.5 + 24.2) ÷ 2 = 25.85 scores M0 M0 A0.
			Total for Question 6: 3 marks
7 A22	−2, −1, 0, 1, 2, 3, 4	**M1** **M1** **A1**	for $-9 < 3n$ or $3n \leq 12$ oe for $-3 < n \leq 4$ or −3 and 4 identified as the critical values for −2, −1, 0, 1, 2, 3, 4 and no extras A list with one error or omission, e.g. −3, −2, ..., 4, scores M1 M1 A0.
			Total for Question 7: 3 marks
8 R5 R8	90	**M1** **M1** **A1**	for $3k + 6 : 5k = 2 : 3$ or $\frac{3k+6}{5k} = \frac{2}{3}$ oe, or for equivalent ratios 9 : 15 and 10 : 15 compared for $3(3k + 6) = 10k$ ($k = 18$), or 1 part = 6 from 10 − 9 = 1 for 90 Trial and improvement leading to 90 with checking scores full marks.
			Total for Question 8: 3 marks
9(a) P8 P9	1st throw: 0.2, 0.8. 2nd throw (each pair): 0.2, 0.8	**B1** **B1**	for 0.8 on the 1st throw Not bullseye branch for 0.2 and 0.8 correctly placed on both pairs of 2nd throw branches
9(b)	0.32	**M1** **A1**	for 0.2 × 0.8 (= 0.16), ft their tree for 0.32 oe 0.16 only scores M1 A0. 0.2 + 0.8 or 0.2 × 0.8 + 0.8 × 0.8 scores M0.
			Total for Question 9: 4 marks
10(a) A5 A2	$t = \frac{5-3y}{2}$	**M1** **A1**	for a correct first step, e.g. $3y = 5 - 2t$ for $t = \frac{5-3y}{2}$ oe, e.g. $t = \frac{3y-5}{-2}$

Q	Answer	Mark	Guidance
10(b)	9.4	**B1**	for 9.4 (ft their formula from (a))
			Total for Question 10: 3 marks
11 G20	11.0 cm	**M1** **M1** **A1**	for recognising cosine is needed, e.g. $\cos 41 = \frac{8.3}{x}$ for 8.3 ÷ cos 41 for 11.0 (from 10.997...; accept 10.99 to 11.0) 8.3 × cos 41 (= 6.26...) scores M1 M0 A0. A calculator in radian mode gives –8.40...; this scores M1 M1 A0.
			Total for Question 11: 3 marks
12 G17 N16	~~£~~425	**M1** **M1** **M1** **A1**	for $\pi r^2 = 90$ or $r^2 = \frac{90}{\pi}$ (= 28.6...) for $r = \sqrt{\frac{90}{\pi}}$ (= 5.35...) for 2 × π × their r (= 33.6...) for 425 cao (from 34 m) 33.6 × 12.50 = 420.4... scores M1 M1 M1 A0. Using 90 as the diameter or radius scores M0.
			Total for Question 12: 4 marks