Mark scheme

Plotting curves and graphical solutions

Mathematics 0580 · Questions from Paper 1, Paper 2, Paper 3 and Pape…

Total marks

57

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
2	3	4	4	5	6	6	6	9	12	**57**

Question 1 [2]

1	*a* any negative integer *n* any even (positive) integer	**2**	**B1** for one correct

Question 2 [3]

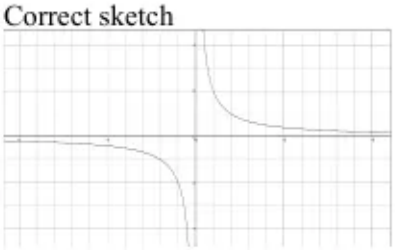
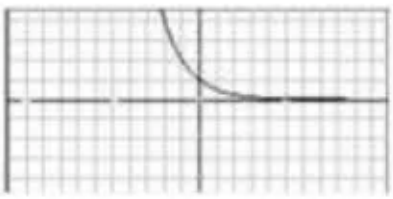
2	[*b* =] 10 [*c* =] 37	**3**	**B2** for *b* = 10 or *c* = 37 OR **M1** for correct method for *b* e.g. • $(x + 5)^2 + 12$ • $2x + b = 0$ oe • $\frac{-b}{2[1]} = -5$ **M1** for correct method for *c* e.g. • $x^2 + 5x + 5x + 25$ [+ 12] oe • $12 = (-5)^2 + \textit{their } b \times -5 + c$ oe • $c - \frac{(\textit{their } b)^2}{4[1]} = 12$ oe

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Question 3 **[4]**

3(a)	$x = 1$ oe	**1**	
3(b)(i)	$6^2 - 2 \times 6 - 3$ [leading to 21]	**1**	
3(b)(ii)	–4	**1**	
3(c)	–3	**1**	

Question 4 **[4]**

4(a)	Correct sketch 	**2**	**B1** for one correct branch or attempt at correct shape
4(b)	Correct sketch 	**2**	**B1** for correct shape but crossing x-axis or for correct shape but just drawn in one quadrant

Question 5 **[5]**

5 (a)	0.7 to 0.8 and 5.2 to 5.4	**2**	**B1 B1**
(b)	–2 to –1 but must have a tangent at $x = 1$ for full marks	**3**	**M1** drawing tangent at $x = 1$ **M1** for using $y$step/$x$step on their tangent wherever it is drawn

Question 6 **[6]**

6(a)	5 –4 5	**2**	**B1** for 2 correct
6(b)	Correct curve	**4**	**B3FT** for 8 points correctly plotted **B2FT** for 6 points correctly plotted **B1FT** for 4 points correctly plotted

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Question 7 **[6]**

7(a)	(2, 0)	**1**	
7(b)	$x = 0$, $y = -1$	**2**	**B1** for each
7(c)	$y = x$ ruled	**B1**	
	$x = -2$ and $x = 1$	**B2**	**B1** for one correct or for two correct answers FT from *their* line

Question 8 **[6]**

8(a)	$x^2 - x - x + 1$ or $x^2 + 2x - x - 2$	**M1**	
	A correct unsimplified expansion e.g. $x^3 + 2x^2 - x^2 - 2x - x^2 - 2x + x + 2$ oe leading to $[y =] x^3 - 3x + 2$	**A1**	
8(b)	$y = 2 - 0.5x$ ruled	**B2**	**B1** for $[y =] 2 - 0.5x$ soi or for $y = 2 - kx$ drawn or for $y = k - 0.5x$ drawn
	–1.5 to –1.6 0 1.5 to 1.6	**B2**	**B1** for two correct values

Question 9 **[9]**

9(a)	–2 –4 –12 12 4 2	**3**	**B2** for 4 correct or **B1** for 1 correct
9(b)	Correct curve	**4**	**B3FT** for 9 points correctly plotted or **B2FT** for 7 points correctly plotted or **B1FT** for 5 points correctly plotted
9(c)	$y = -9$ correctly drawn, ruled	**1**	
9(d)	–1.4 to –1.2	**1**	FT *their* curve and $y = -9$

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Question 10 **[12]**

10(a)	9, – 6, 9	**3**	**B1** for each
10(b)	Correct graph	**4**	**B3FT** for 6 or 7 correct points or **B2FT** for 4 or 5 correct points or **B1FT** for 2 or 3 correct points
10(c)	–3.5 to –3.35 and 0.8 to 0.9..	**2FT**	**FT** *their* graph **B1FT** for either
10(d)	$a = \frac{5}{4}$ or $1\frac{1}{4}$ or 1.25 $b = -\frac{49}{8}$ or $-6\frac{1}{8}$ or –6.125	**3**	**B2** for either correct or **M1** for [2]$\left(x+\frac{5}{4}\right)^2$ seen isw or for $2x^2 + 4ax + 2a^2 + b$

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