

# Coordinate Geometry and Differentiation

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1	7	(4, 2)	2	<b>M1</b> $\frac{2+6}{2}$ and $\frac{-5+9}{2}$ oe or a drawing used correctly
2	8	10 www	2	<b>M1</b> $(-2 - -8)^2 + (10 - 2)^2$ or better
3	7	13	3	<b>B1</b> for 12, 5 seen <b>M1</b> for $(\text{their } 12)^2 + (\text{their } 5)^2$ or <b>M2</b> $\sqrt{[(-8 - 4)^2 + (1 - 6)^2]}$ oe or <b>M1</b> if $\sqrt{\quad}$ missing
4	8	13.6 or 13.60...	3	<b>M2</b> for $\sqrt{(-4 - 7)^2 + (6 - (-2))^2}$ oe or <b>M1</b> for $(-4 - 7)$ oe or $(6 - (-2))$ oe
5	2	Any two of (20, 8) (-4, 0) (12, 24)	2	<b>B1</b> for one correct
6	7	11	2	<b>M1</b> for $-2 \times -7 - 3$ soi
7	17	$y = 2x - 1$	3	<b>B2</b> for $y = mx - 1$ or $y = 2x + c$ or $2x - 1$ or <b>B1</b> for gradient = 2, <b>B1</b> for $c = -1$ or <b>SC1</b> for $\frac{6}{3}$ or $\frac{5 - -1}{3[-0]}$
8	15	$y = -2x + 8$ cao oe	3	<b>M1</b> $(m =) \frac{8-2}{0-3}$ oe <b>B1</b> $c = 8$ or $y = mx + 8$ or subst. correct point in $y = "m" x + c$
9	13	$y = -0.5x + 11.5$ oe	3	<b>B2</b> for $y = -0.5x + k$ oe or $y = kx + 11.5, k \neq 0$ oe or $-0.5x + 11.5$ oe  or <b>B1</b> for gradient = $-0.5$ oe and <b>B1</b> for $y$ -intercept = 11.5 oe  If zero scored then, <b>SC1</b> for $9 = \text{their } m \times 5 + c$  or $13 = \text{their } m \times -3 + c$
10	15	(a) 4  (b) $y = -2x + 9$ oe	1  3	<b>M1</b> $\frac{5-3}{2-3}$ oe <b>M1</b> substitution of a point into their equation If <b>M1</b> only then <b>A1</b> ft for $y = "m"x + "c"$ used correctly with their numeric values

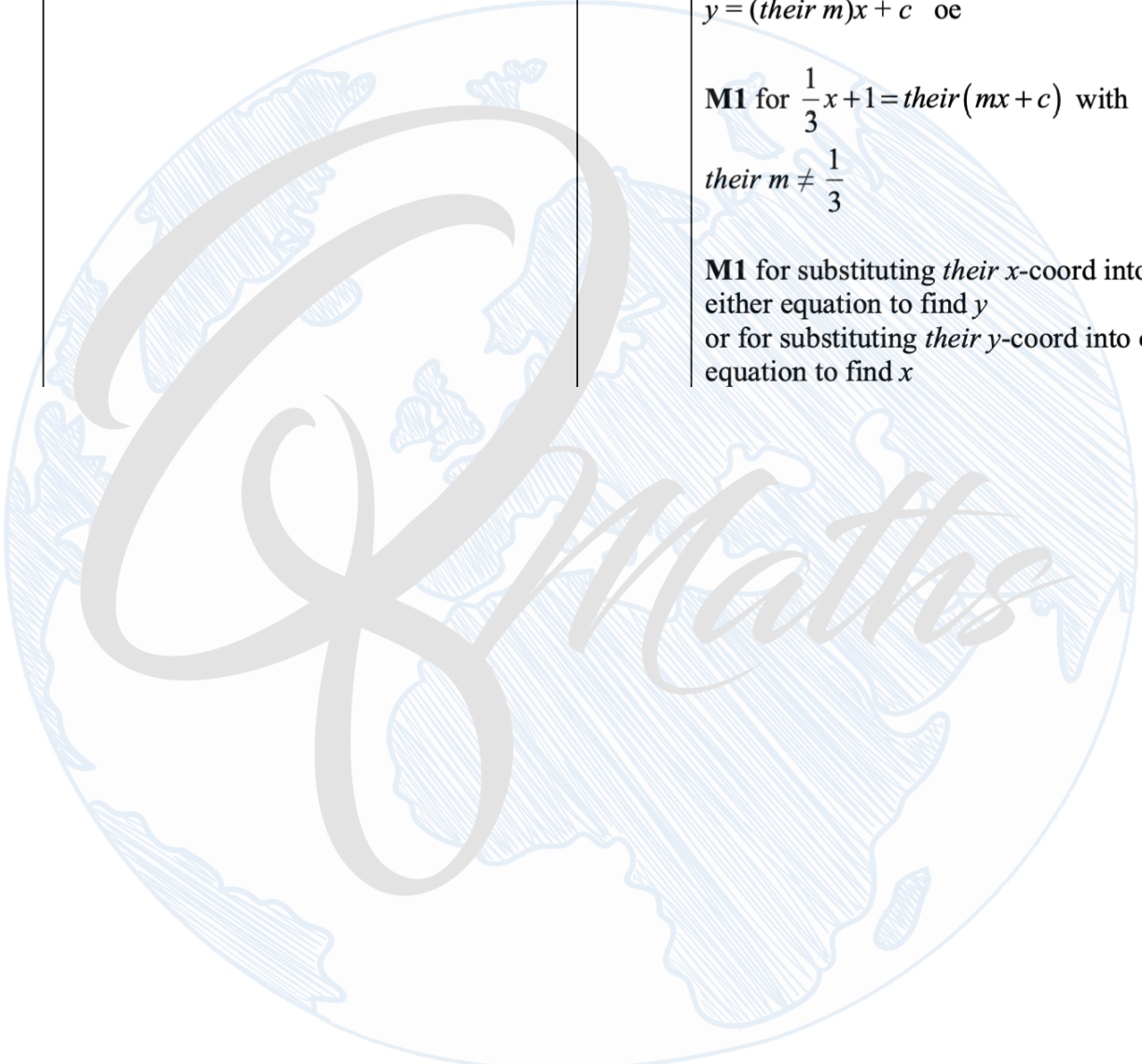
11	18	(a) (1.5, 12.5) oe (b) $y = 3x + 8$ oe  (c) Most common methods: Correctly substituting $P(3, 17)$ into $y = 3x + 8$ Showing the gradient of $AP$ or $BP = 3$ Other methods possible.	2 3  1	<b>B1</b> for either coordinate <b>B2</b> for $y = mx + 8$ or $y = 3x + c$ or $3x + 8$ or <b>B1</b> for gradient (or $m$ ) = 3 and <b>B1</b> for $c = 8$  If 0 scored, <b>SC1</b> for $23 = \text{their } m \times 5 + c$ or for $2 = \text{their } m \times -2 + c$ or for $12.5 = \text{their } m \times 1.5 + c$
12	21	(a) Bisector (b) (4, 2) (c) $y = -2x + 10$ oe	2 1 3	<b>B1</b> accurate line <b>B1</b> two sets of correct arcs  <b>B1</b> correct $m$ <b>B1</b> correct $c$ <b>M1</b> correct use of $y = mx + c$ oe on answer line
13	14	$y = 4x + 1$	3	<b>B1</b> correct numerical $y = mx + c$ <b>B1</b> $c = 1$ <b>B1</b> $m = 4$
14	5	(a) (0, 5) (b) -1	1 1	
15	20	(a) 10 (b) $y = -4x + 5$ oe (c) $y = -4x + 24$ oe	2 2 3	<b>M1</b> $x = -4$ and $x = 6$ seen <b>B1</b> $y = mx + 5$ ( $m \neq 0$ ) or $y = -4x + k$ ( $k \neq 0$ ) or $y = -4x + 5$ <b>M1</b> $m = -4$ or gradient = $-4$ or $y = -4x + c$ <b>M1</b> (5, 4) substituted into $y = mx + c$
16	15	(a) (2, 4) (b) (6, 0) (c) (i) (4, 2) ft (ii) $y = -3x + 14$ oe	1 1 1ft 2	From (a) and (b) <b>M1</b> sub their (c)(i) into $y = -3x + c$ oe
17	22	$y \geq 1, x \leq 3, y \leq x + 5$ oe	5	<b>B1</b> $y \geq 1$ <b>B1</b> $x \leq 3$ <b>B2</b> $y \leq x + 5$ or <b>B1</b> $y \leq -x + 5$ where R is any inequality <b>B1</b> all 3 inequalities correct
18	17	(a) (-5, 0) (b) -2 (c) $2\frac{1}{2}$ or $\frac{5}{2}$	2 1 2	<b>B1</b> (k, 0) or (-5, k)  <b>M1</b> $\frac{5}{4} = \frac{k}{2}$ oe
19	18	(a) 2 cao (b) $y = 2x + 6$ oe	2  2FT	<b>M1</b> for rise/run attempted e.g. $4/2$ or other correct method for finding gradient or <b>SC1</b> for $y = 2x - 1$ as answer  <b>FT</b> for $y = \text{their}(a)x + 6$ <b>B1</b> for $y = mx + 6$ ( $m \neq 0$ or 2) or $y = 2x [+k]$ or $y = \text{their}(a)x [+k]$ ( $k \neq 6$ ) or for answer $2x + 6$ or answer $\text{their}(a)x + 6$



20	18	(a) $(6, 1\frac{1}{2})$ (b) $y = -\frac{1}{5}x + 4$ oe	1  3	 <b>B1</b> correct numerical format <b>B1</b> correct $m$ <b>B1</b> correct $c$
21	16	(a) 3.61 (b) $y = \frac{1}{2}x + 2\frac{1}{2}$ oe	3  3	<b>M1</b> $(3-1)^2 + (0-3)^2$ oe <b>M1</b> $\sqrt{2^2 + 3^2}$ <b>B2</b> $y = \frac{1}{2}x + k$ or $y = kx + 2\frac{1}{2}$ or <b>B1</b> $kx + 2\frac{1}{2}$ or $\frac{1}{2}x + k$ If 0 scored <b>B1</b> $m = \frac{1}{2}$ <b>B1</b> $c = 2\frac{1}{2}$ clearly identified in working
22	14	$y = \frac{2}{3}x - 2$ oe	4	<b>B1</b> for $(9, 4)$ and <b>M2</b> for $y = kx - 2$ ( $k \neq 0$ ) or $y = \frac{2}{3}x + k$ ( $k \neq 0$ ) or $\frac{2}{3}x - 2$ or <b>M1</b> for $y = \frac{2}{3}x$ or $\frac{2}{3}x + k$ ( $k \neq 0$ )
23	17	(a) $[y = ] 2x + 3$ cao  (b) $-\frac{1}{2}$ oe	3  <b>1FT</b>	<b>M2</b> for correct unsimplified equation or <b>B1</b> for gradient = $(11-3) \div (4-0)$ or better and <b>B1</b> for $c = 3$  $-1 \div \text{their } m$
24	14	$3y + x = 19$ oe	3	<b>M1</b> for $\text{their } m \times 3 = -1$ oe or $-\frac{1}{3}$ soi  <b>M1</b> for $4 = 7 \times \text{their } m + c$
25	25	$y = -\frac{3}{7}x + 11$ oe	6	<b>B2</b> for gradient = $-\frac{3}{7}$ or <b>M1</b> for [gradient = ] $\frac{15-1}{10-4}$ oe or for the negative reciprocal of $\text{their}$ gradient and <b>B2</b> for [midpoint of $AB =$ ] $(7, 8)$ or <b>B1</b> for $(7, k)$ or $(k, 8)$ and <b>M1</b> for substitution of $\text{their}$ midpoint or $(4, 1)$ or $(10, 15)$ into a linear equation

26	20 (a)	$(7, 1)$	1	
	(b)	$-1.25$ or $-\frac{5}{4}$ or $-1\frac{1}{4}$	2	M1 for rise/run
	(c)	$y = \frac{4}{5}x + 2$ oe	3	B2 for $\frac{4}{5}x + 2$ or $y = \frac{-1}{\text{their}(b)}x + 2$ oe or M1 for $-\frac{1}{\text{their}(b)}$ oe or B1 for $\frac{4}{5}x$ seen or $[y = ]mx + 2$ ( $m \neq 0$ )
27	17	$y = 2x$ oe	3	M1 for $\frac{1-3}{12-8}$ oe M1 for perpendicular gradient $\times$ their $\frac{1-3}{12-8} = -1$ oe If zero scored, SC1 for answer $y = kx$ $k \neq 2$ or 0
28	24(a)	78.7 or 78.69...	3	M2 for $\tan = \frac{5}{2-1}$ oe or M1 for use of tangent oe
	24(b)	$[y = ]-\frac{1}{3}x + 12$ final answer	3	M1 for gradient $= -\frac{1}{3}$ M1 for substituting (6, 10) into $v = \text{their } mx + c$
29	27(a)	$y = 2x + 4$	3	B2 for $2x + 4$ or $y = 2x + c$ or $y = mx + 4$ or B1 for $2x + c$ or for $kx + 4$ or M1 for rise/run
	27(b)	$y = -\frac{1}{2}x + \frac{3}{2}$ oe	4	B1 for $(-1, 2)$ M1 for the gradient $-\frac{1}{2}$ oe or $\frac{-1}{\text{their } 2}$ oe M1 for substituting their $(-1, 2)$ into their $y = mx + c$ oe
30	25(a)	$[y = ]-\frac{2}{5}x + 3$ or $[y = ]-0.4x + 3$ final answer	4	B2 for [gradient of perpendicular =] $-\frac{2}{5}$ oe or M1 for [gradient =] $\frac{24-9}{22-16}$ or $-\frac{22-16}{24-9}$ M1 for substituting (5, 1) into $y = \text{their } mx + c$
	25(b)	$(20, 19)$	2	M1 for $\frac{2}{3}(22-16) + 16$ or $\frac{2}{3}(24-9) + 9$ oe or SC1 for answer (18, 14)

31	21(a)	$4 - 2x$	2   <b>B1</b> for 4 or $-2x$
	21(b)	(2, 10)	2   <b>B1</b> for $x$ -coordinate of 2 or <b>M1</b> for <i>their</i> $4 - 2x = 0$
32	24	(2.4, 1.8) oe	5   <b>M1</b> for [gradient =] $-1 \div \frac{1}{3}$ oe <b>M1</b> for substituting (2, 3) into $y = (\textit{their } m)x + c$ oe  <b>M1</b> for $\frac{1}{3}x + 1 = \textit{their}(mx + c)$ with $\textit{their } m \neq \frac{1}{3}$  <b>M1</b> for substituting <i>their</i> $x$ -coord into either equation to find $y$ or for substituting <i>their</i> $y$ -coord into either equation to find $x$



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