Chapter 4

Coordinate geometry

01. 0607_m23_qp_22 Q: 10

The point A has coordinates (2, 9) and the point B has coordinates (5, 3).

Find the length of AB.
Give your answer in surd form.

..... [3]

02. 0607_s23_qp_23 Q: 16

The point A has coordinates (2, 3) and the point B has coordinates (6, 5).
The point C lies on the line AB.
The point D has coordinates (2, 5.5).
CD is perpendicular to AB.

Find the coordinates of C.

(..... , ...) [5]

03. 0607_s22_qp_22 Q: 10

A is the point (–1, 13) and B is the point (3, 1).

Find the equation of the line AB, giving your answer in the form $y = mx + c$.

$y =$ ..... [3]

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04. 0607_s22_qp_23 Q: 10

A is the point (−5, 7) and C is the point (1, −2).

(a) B is the mid-point of AC.

Find the coordinates of B.

(..... , ...) [2]

(b) The line CD is perpendicular to the line AC.

Find the equation of line CD.

..... [4]

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05. 0607_s22_qp_23 Q: 12

$\mathbf{a} = \begin{pmatrix} 4 \\ -10 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -4 \\ 2 \end{pmatrix}$

Find the magnitude of the vector $\mathbf{a} - \mathbf{b}$.
Give your answer in its simplest surd form.

..... [4]

06. 0607_w22_qp_21 Q: 10

A is the point (1, 11) and B is the point (4, 5).

Find the equation of the perpendicular bisector of AB.
Give your answer in the form $y = mx + c$.

$y =$ ..... [5]

07. 0607_m21_qp_22 Q: 5

Point A has coordinates $(-3, 2)$.
Point B has coordinates $(5, -4)$.

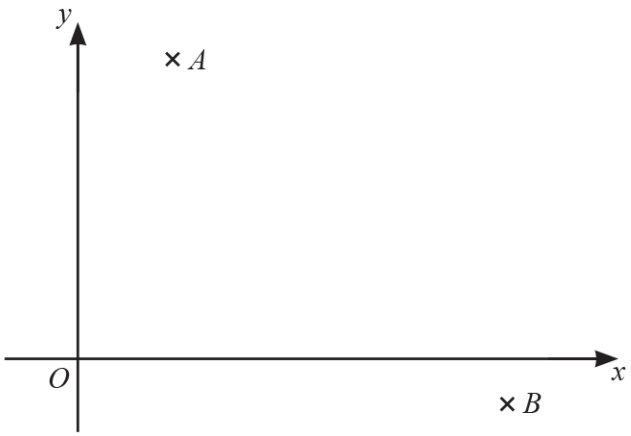
(a) Find the mid-point of AB.

(..... , ...) [2]

(b) Find the length of AB.

..... [3]

08. 0607_s21_qp_21 Q: 11



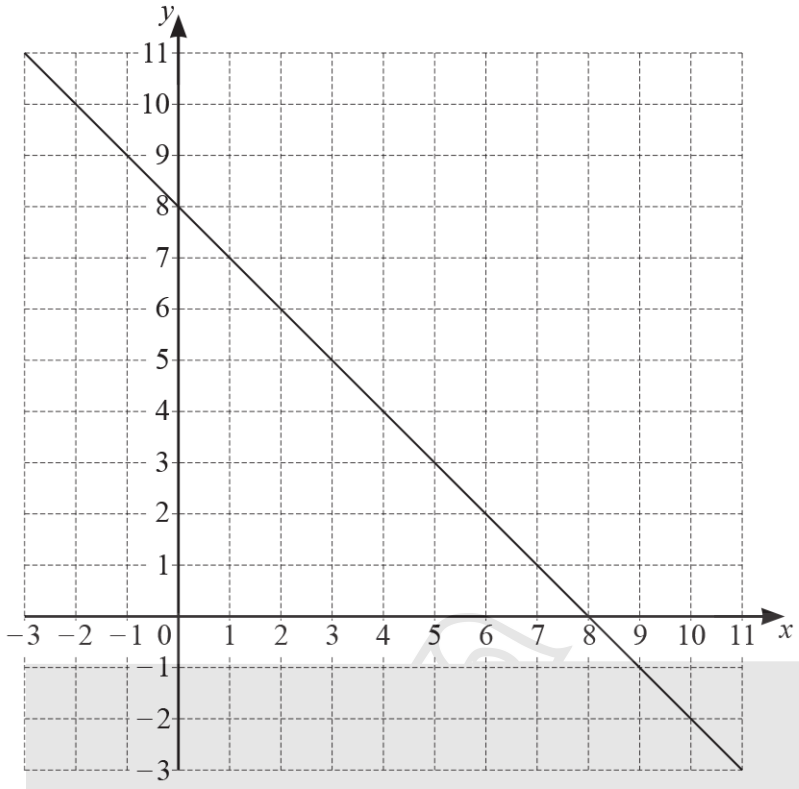
NOT TO SCALE

The points A (2, 8) and B (6, −2) are shown on the diagram.

Find the equation of the perpendicular bisector of the line AB.
Give your answer in the form $y = mx + c$.

$y =$ ..... [5]

09. 0607_s21_qp_22 Q: 15



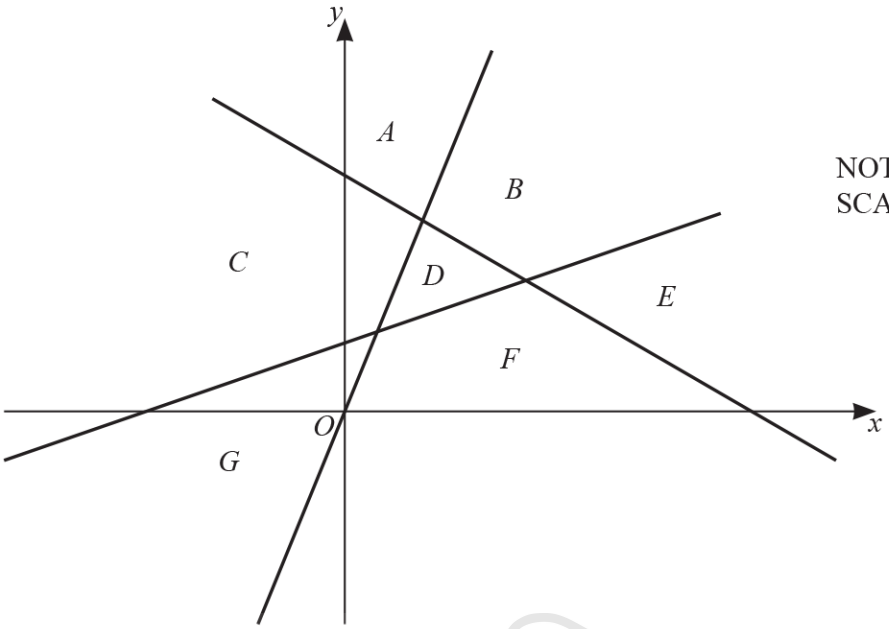
The diagram shows the line $x+y=8$.

On the diagram, show clearly the region defined by these inequalities.

$x+y \leqslant 8$ $x \geqslant 2$ $y \leqslant 3$

[2]

10. 0607_w21_qp_21 Q: 12



NOT TO SCALE

The diagram shows the lines $y = \frac{1}{2}x + 1$, $y = 3x$ and $3x + 4y = 12$.

These lines divide the space into 7 regions, A, B, C, D, E, F, and G.

Write down the letter of the region which is defined by

(a) $y \leqslant \frac{1}{2}x + 1$, $y \leqslant 3x$ and $3x + 4y \leqslant 12$,

Region ..... [1]

(b) $y \geqslant \frac{1}{2}x + 1$, $y \geqslant 3x$ and $3x + 4y \leqslant 12$.

Region ..... [1]

11. 0607_w21_qp_23 Q: 7

A is the point $(3, 7)$ and B is the point $(9, -1)$.

Calculate the length AB.

$AB =$ ..... [3]

12. 0607_s20_qp_22 Q: 14

A is the point (1, 7) and B is the point (4, 13).

Find the equation of the perpendicular bisector of AB in the form $y = mx + c$.

$y =$ ..... [5]

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13. 0607_s20_qp_23 Q: 8

A is the point $(-2, 4)$ and B is the point $(7, 1)$.

Find the length of AB giving your answer in its simplest surd form.

..... [4]

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14. 0607_w20_qp_21 Q: 13

A is the point (1, 7) and B is the point (4, 1).

Find the equation of the perpendicular bisector of AB in the form $y = mx + c$.

$y =$ ..... [5]

15. 0607_s19_qp_21 Q: 11

The point A has co-ordinates (3, 8).
The point B has co-ordinates (7, 0).

(a) Find the co-ordinates of the midpoint of AB.

(..... , ...) [1]

(b) Find the equation of the perpendicular bisector of AB.
Write your answer in the form $y = mx + c$.

$y =$ ..... [3]

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16. 0607_s19_qp_22 Q: 9

Find the equation of the line parallel to the line $y = 3 - x$ that passes through the point (0, 7).

..... [2]

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17. 0607_s19_qp_23 Q: 12

The point A has co-ordinates (1, 3) and the point B has co-ordinates (4, 1).
B is the midpoint of the line AC.

Find the co-ordinates of the point C.

(..... , ...) [2]

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18. 0607_w19_qp_21 Q: 16

A is the point (0, 8) and B is the point (6, 0).
The line L passes through B and is perpendicular to AB.

Find the equation of L.

..... [4]

19. 0607_w19_qp_22 Q: 10

The point A has co-ordinates $(1, -5)$ and the point B has co-ordinates $(9, 1)$.

Find the equation of the perpendicular bisector of AB in the form $y = mx + c$.

$y =$ ..... [5]

20. 0607_w19_qp_23 Q: 12

The equation of the line L is $y = 3x - 2$.

(a) Find the co-ordinates of the point A, where the line L crosses the y-axis.

(..... , ...) [1]

(b) Find the co-ordinates of the point B, where the line L crosses the x-axis.

(..... , ...) [1]

(c) The line M passes through the point A and is perpendicular to the line L.

Find the equation of the line M.

..... [2]

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21. 0607_s18_qp_22 Q: 8

Point A has co-ordinates (2, 12). Point B has co-ordinates (4, 2).

Find the co-ordinates of the midpoint of AB.

(..... , ...) [2]

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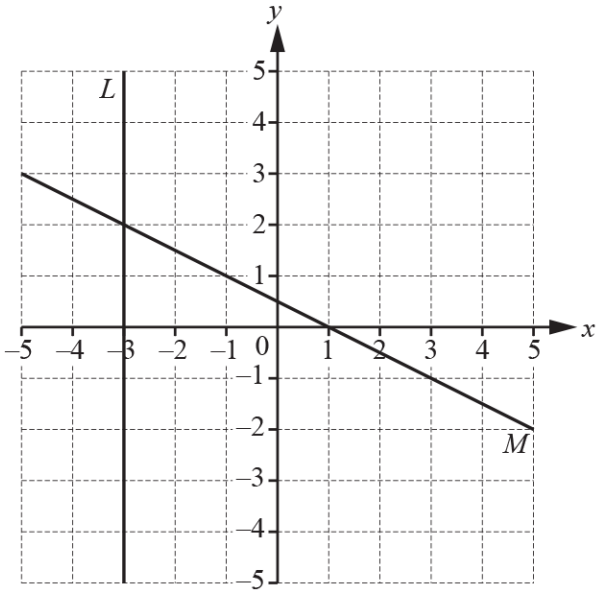
22. 0607_s18_qp_22 Q: 14

Point A has co-ordinates (2, 3). Point B has co-ordinates (4, 11).

Find the equation of the line AB.
Give your answer in the form $y = mx + c$.

$y =$ ..... [3]

23. 0607_s18_qp_23 Q: 1



(a) Write down the equation of line L.

..... [1]

(b) Write down the co-ordinates of the point of intersection of line L and line M.

(..... , ...) [1]

(c) Find the gradient of line M.

..... [2]

24. 0607_s18_qp_23 Q: 7

Q is the point (3, 7) and $\overrightarrow{PQ} = \begin{pmatrix} -6 \\ 3 \end{pmatrix}$.

(a) Find the co-ordinates of P.

(..... , ...) [2]

(b) Find $\left|\overrightarrow{PQ}\right|$.
Give your answer in its simplest surd form.

..... [3]

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25. 0607_w18_qp_21 Q: 8

The point A has co-ordinates (1, 9). The point B has co-ordinates (4, 5).

Find the length of AB.

..... [2]

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26. 0607_w18_qp_23 Q: 13

Find the equation of the straight line perpendicular to the line $y = 2x + 1$ that passes through the point (2, 5).
Give your answer in the form $y = mx + c$.

$y =$ ..... [3]

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27. 0607_s17_qp_21 Q: 11

A is the point (3, 11) and B is the point (7, 3).

Find the equation of the line AB, giving your answer in the form $y = mx + c$.

$y =$ ..... [3]

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28. 0607_w17_qp_21 Q: 6

A is the point (3, 6) and B is the point $(-5, 10)$.

(a) Work out the co-ordinates of the midpoint of AB.

(..... , ...) [2]

(b) Find the length of AB, giving your answer in the form $a\sqrt{5}$.

..... [3]

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29. 0607_w17_qp_23 Q: 2

A is the point (1, 3) and B is the point (4, 9).

Find $\overrightarrow{AB}$.

$\overrightarrow{AB} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [2]

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30. 0607_w17_qp_23 Q: 13

A is the point (1, 8) and B is the point (5, 0).

Find the equation of the perpendicular bisector of AB in the form $y = mx + c$.

$y =$ ..... [4]

01. 0607_m23_ms_22 Q: 10

Question	Answer	Marks	Partial Marks
	$\sqrt{45}$ or $3\sqrt{5}$ final answer	3	**M2** for $(5-2)^2+(3-9)^2$ oe or **M1** for $(5-2)$ or $(3-9)$ oe

02. 0607_s23_ms_23 Q: 16

Question	Answer	Marks	Partial Marks
	(3, 3.5) oe	5	**M1** for grad $AB = \frac{5-3}{6-2}$ oe or better **M1** for equation of AB $y = 0.5x + 2$ oe **M1** for grad $CD = \frac{-1}{their\ \text{grad}\ AB}$ **M1** for $\frac{5.5 - their(0.5p+2)}{2-p} = their\ \text{grad}\ CD$ oe where 'p' is x-coordinate of C If 0 scored, **SC1** for $(3, k)$ or $(k, 3.5)$

03. 0607_s22_ms_22 Q: 10

Question	Answer	Marks	Partial Marks
	$[y =] -3x + 10$	3	**M1** for $[\text{Grad} =] \frac{13-1}{-1-3}$ oe **M1** for subst *their* grad and A or B correctly into $y = mx + c$. or **M1** for $y - 1 = their(-3) \times (x - 3)$ or $y - 13 = their(-3) \times (x + 1)$

04. 0607_s22_ms_23 Q: 10

Question	Answer	Marks	Partial Marks
(a)	(–2, 2.5) oe	2	**B1** for each coordinate

Question	Answer	Marks	Partial Marks
(b)	$y = \frac{2}{3}x - \frac{8}{3}$ oe	4	Equivalent 3 term equation. **M1** for gradient of $BC = \frac{-2-7}{1-(-5)}$ oe **M1** for gradient of $CD = -1 \div (their\ -\frac{3}{2})$ **M1** for substituting (1, – 2) and their m into $y = mx + c$ oe

05. 0607_s22_ms_23 Q: 12

Question	Answer	Marks	Partial Marks
	$4\sqrt{13}$	4	**B3** for $\sqrt{208}$ OR **B1** for $\begin{pmatrix} 8 \\ -12 \end{pmatrix}$ oe **M1** for $(their\ 8)^2 + (their(-12))^2$

06. 0607_w22_ms_21 Q: 10

Question	Answer	Marks	Partial Marks
	$y = \frac{1}{2}x + \frac{27}{4}$	5	**M1** for $\frac{11-5}{1-4}$ [= –2] **M1** for Grad perp $= -\frac{1}{their(-2)}$ **B1** for mid-point (2.5, 8) **M1** for correct substitution of *their* mid-point and gradient into $y = mx + c$.

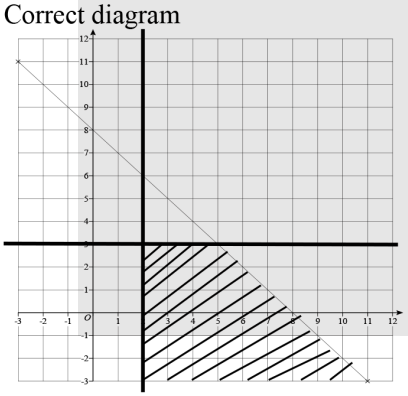
07. 0607_m21_ms_22 Q: 5

Question	Answer	Marks	Partial Marks
(a)	(1, –1)	2	**B1** for each
(b)	10	3	**M2** for $(5-(-3))^2+((-4)-2)^2$ oe or **M1** for $(5-(-3))$ or $((-4)-2)$ oe

08. 0607_s21_ms_21 Q: 11

Question	Answer	Marks	Partial Marks
	$[y=]\frac{2}{5}x+\frac{7}{5}$ oe final answer	5	**B1** for mid-point (4, 3) **M1** for [gradient =] $\frac{8--2}{2-6}$ oe **M1** for grad perp = $\frac{-1}{their\,(-2.5)}$ **M1** for correct substitution of *their* mid-point and *their* perpendicular gradient into $y = mx + c$

09. 0607_s21_ms_22 Q: 15

Question	Answer	Marks	Partial Marks
	Correct diagram 	2	**B1** for $x = 2$ and $y = 3$ drawn

10. 0607_w21_ms_21 Q: 12

Question	Answer	Marks	Partial Marks
(a)	*F*	1	
(b)	*C*	1	

11. 0607_w21_ms_23 Q: 7

Question	Answer	Marks	Partial Marks
	10	3	**M2** for $(9-3)^2+(7-(-1))^2$ oe or **M1** for $(9-3)$ or $(7-(-1))$ oe

12. 0607_s20_ms_22 Q: 14

Question	Answer	Marks	Partial Marks
	$[y=]-0.5x+11.25$	5	**B1** (2.5, 10) seen **M1** for gradient $=\frac{13-7}{4-1}$ oe **M1** grad of perp $=-1/$*their* grad **M1** for subst *their* grad and *their* (2.5, 10) into $y=mx+c$

13. 0607_s20_ms_23 Q: 8

Question	Answer	Marks	Partial Marks
	$3\sqrt{10}$	4	**B3** for $\sqrt{90}$ or **B1** for 9 and 3 seen **M1** for (*their* 9)^2 + (*their* 3)^2

14. 0607_w20_ms_21 Q: 13

Question	Answer	Marks	Partial Marks
	$y=\frac{1}{2}x+\frac{11}{4}$	5	**M1** for gradient $=\frac{7-1}{1-4}$ oe **M1** for gradient perp $=\frac{-1}{\textit{their}\text{ gradient}}$ **B1** for midpoint (2.5, 4) seen **M1** for subst *their* gradient (perp) and *their* mid-point into $y=mx+c$

15. 0607_s19_ms_21 Q: 11

Question	Answer	Marks	Partial Marks
(a)	(5, 4)	1	

Question	Answer	Marks	Partial Marks
(b)	$[y =] \frac{1}{2}x + 1\frac{1}{2}$ oe	3	**M1** for $\frac{8-0}{3-7}$ oe or gradient = –2 **M1** for gradient of perpendicular $= \frac{-1}{their\ \text{gradient}}$

16. 0607_s19_ms_22 Q: 9

Question	Answer	Marks	Partial Marks
	$y = 7 - x$ oe	2	**B1** for $y = k - x$ or for $y = 7 - kx$ or for $7 - x$

17. 0607_s19_ms_23 Q: 12

Question	Answer	Marks	Partial Marks
	(7, –1)	2	**B1** for (7, *k*) or (*k*, –1) If 0 scored **SC1** for (2.5, 2)

18. 0607_w19_ms_21 Q: 16

Question	Answer	Marks	Partial Marks
	$y = \frac{3}{4}x - \frac{9}{2}$ oe	4	**M1** for gradient of $AB = -\frac{4}{3}$ oe **M1** for gradient of $L = -\frac{1}{their - \frac{4}{3}}$ **M1** for substitution of (6, 0) in *their* $y = mx + c$ oe

19. 0607_w19_ms_22 Q: 10

Question	Answer	Marks	Partial Marks
	$y = -\frac{4}{3}x + \frac{14}{3}$	5	**M1** for $\frac{1-(-5)}{9-1}$ oe **M1** for grad = $-\frac{1}{their\ \text{gradient}}$ **M1** for midpoint $\left(\frac{9+1}{2}, \frac{-5+1}{2}\right)$ oe **M1** for subst (*their* midpoint) and (*their* gradient) into $y = mx + c$

20. 0607_w19_ms_23 Q: 12

Question	Answer	Marks	Partial Marks
(a)	(0, –2)	1	
(b)	$\left(\frac{2}{3}, 0\right)$ oe	1	
(c)	$y = -\frac{1}{3}x - 2$ oe	2	**FT** *their* **(a)** **B1** for $m = -\frac{1}{3}$

21. 0607_s18_ms_22 Q: 8

Question	Answer	Marks	Partial Marks
	(3, 7)	2	**B1** for each

22. 0607_s18_ms_22 Q: 14

Question	Answer	Marks	Partial Marks
	$4x - 5$	3	**M1** for $\frac{11-3}{4-2}$ oe **M1** for correct substitution of *their* 'm' and a point

23. 0607_s18_ms_23 Q: 1

Question	Answer	Marks	Partial Marks
(a)	$x = -3$	1	
(b)	(–3, 2)	1	
(c)	$-\frac{1}{2}$ oe	2	**M1** for clear use of $\frac{y \text{ increase}}{x \text{ increase}}$ If 0 scored **SC1** for $\frac{1}{2}$

24. 0607_s18_ms_23 Q: 7

Question	Answer	Marks	Partial Marks
(a)	(9, 4)	2	**B1** for each co-ordinate
(b)	$3\sqrt{5}$	3	**M1** for $([-]6)^2 + 3^2$ **A1** for $\sqrt{45}$

25. 0607_w18_ms_21 Q: 8

Question	Answer	Marks	Partial Marks
	5	2	**M1** for $(1-4)^2+(9-5)^2$ oe

26. 0607_w18_ms_23 Q: 13

Question	Answer	Marks	Partial Marks
	$-\frac{1}{2}x+6$	3	**B1** for gradient = $-\frac{1}{2}$ **M1** for substitution of (2, 5) into $y=(their\ m)x+c$

27. 0607_s17_ms_21 Q: 11

Question	Answer	Marks	Part Marks
	$[y=]-2x+17$ oe	3	**M2** for $y=-2x+k$ or **M1** for $\frac{11-3}{3-7}$ soi

28. 0607_w17_ms_21 Q: 6

Question	Answer	Marks	Partial Marks
(a)	(–1, 8)	2	**B1** for each co-ordinate or for $\left(\frac{3-5}{2},\frac{6+10}{2}\right)$
(b)	$4\sqrt{5}$	3	**M1** for 8^2+4^2 **A1** for $\sqrt{80}$

29. 0607_w17_ms_23 Q: 2

Question	Answer	Marks	Partial Marks
	$\begin{pmatrix}3\\6\end{pmatrix}$	2	**B1** for each component

30. 0607_w17_ms_23 Q: 13

Question	Answer	Marks	Partial Marks
	$[y=]\frac{1}{2}x+\frac{5}{2}$	4	**B1** for (3, 4) seen **B1** for $-\frac{8}{4}$ oe seen **M1** for grad $=\frac{-1}{their(-2)}$