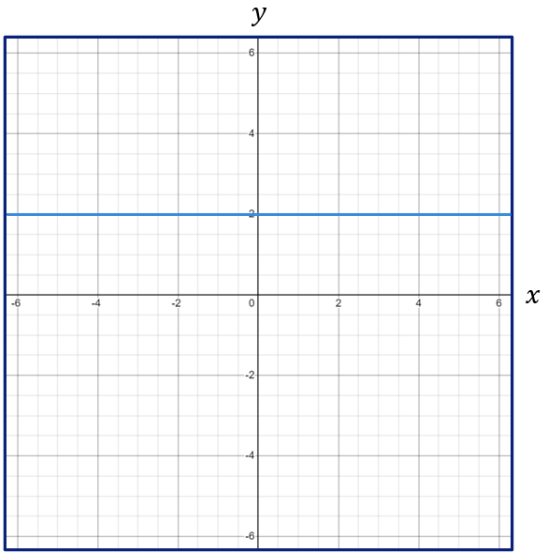
Intersecting Lines - Worksheet

Skill

Group A - Points of intersection using a graph

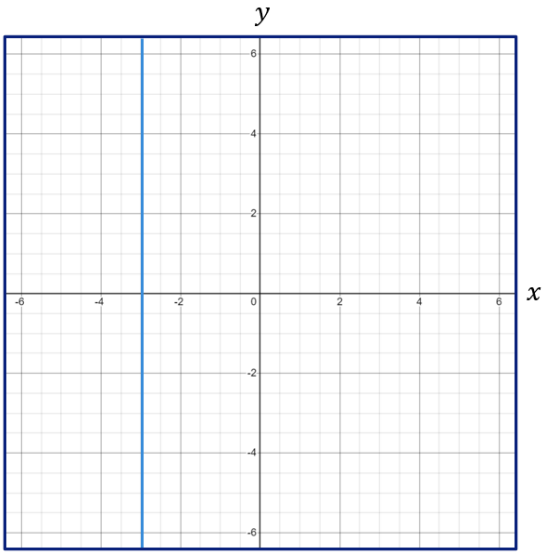
Find the points of intersection:

1) The straight line $y = 2$ has been drawn on the grid.



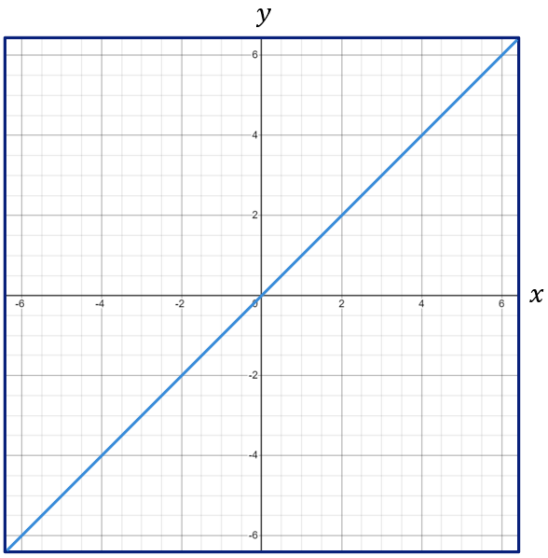
On the same grid, draw the graph of $x = 4$ then use your graphs to find the point of intersection.

2) The straight line $x = -3$ has been drawn on the grid.



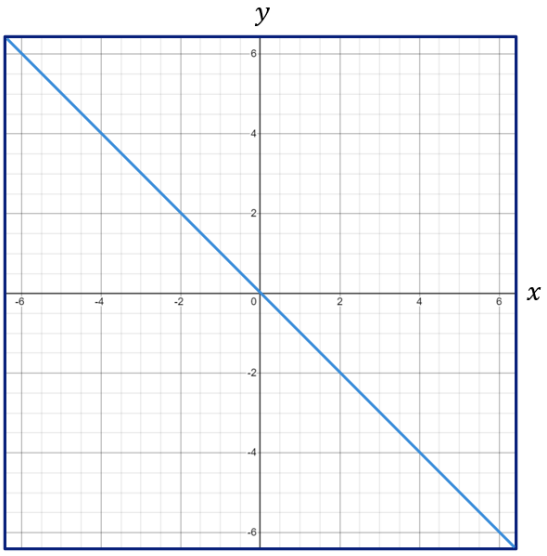
On the same grid, draw the graph of $y = 4$ then use your graphs to find the point of intersection.

3) The straight line $y = x$ has been drawn on the grid.



On the same grid, draw the graph of $y = 2x$ then use your graphs to find the point of intersection.

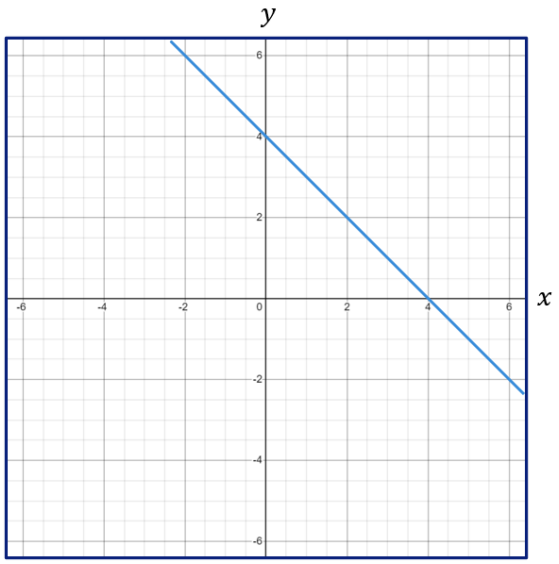
4) The straight line $y = -x$ has been drawn on the grid.



On the same grid, draw the graph of $y = x - 3$ then use your graphs to find the point of intersection.

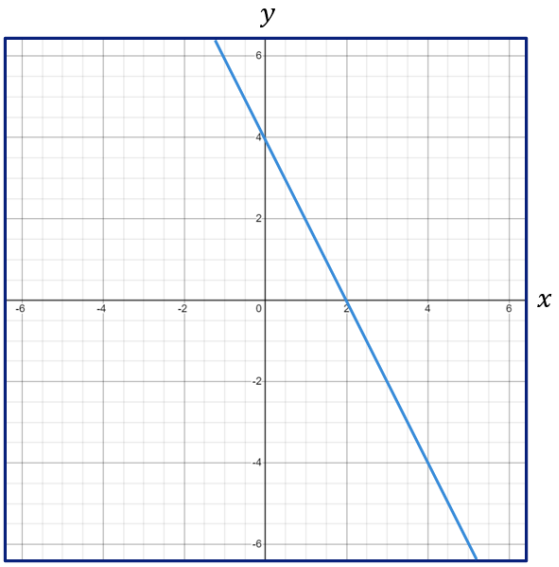
Intersecting Lines - Worksheet

5) The straight line $y = 4 - x$ has been drawn on the grid.



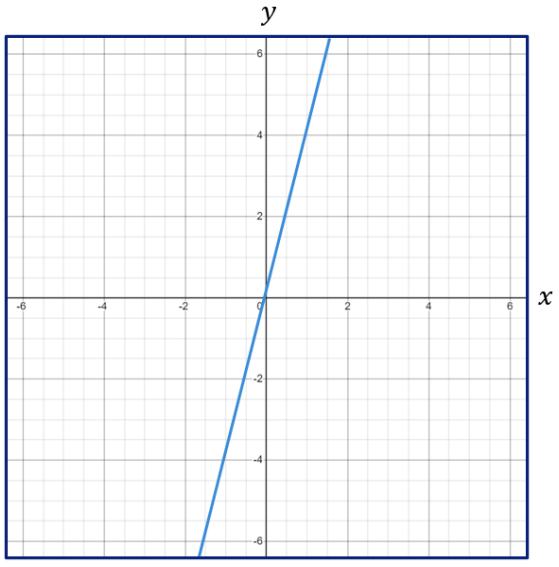
On the same grid, draw the graph of $y = x$ then use your graphs to find the point of intersection.

6) The straight line $y = 4 - 2x$ has been drawn on the grid.



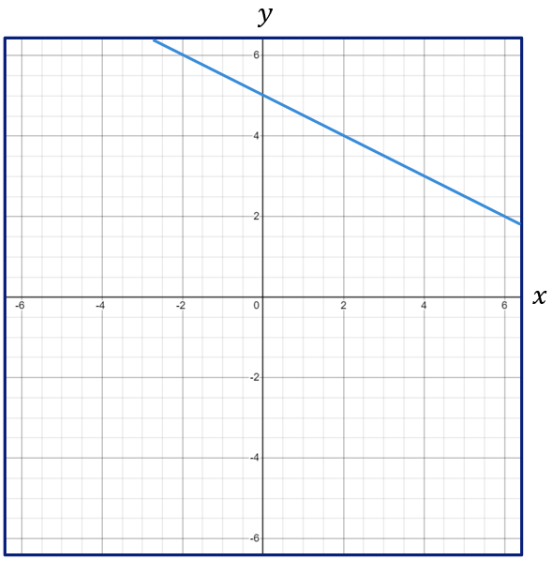
On the same grid, draw the graph of $y = 2x - 1$ then use your graphs to find the point of intersection.

7) The straight line $y = 4x$ has been drawn on the grid.



On the same grid, draw the graph of $y = 5 - x$ then use your graphs to find the point of intersection.

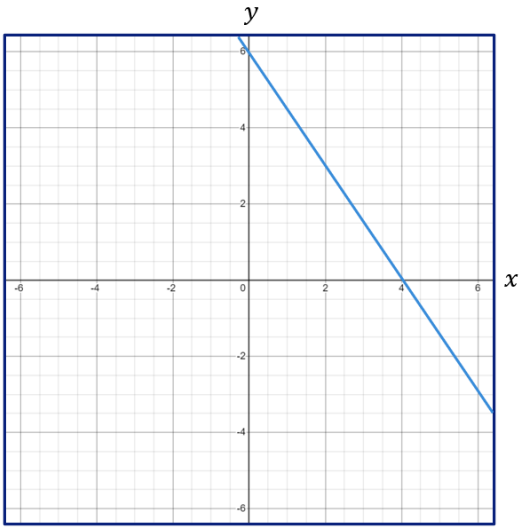
8) The straight line $y = -\frac{1}{2}x + 5$ has been drawn on the grid.



On the same grid, draw the graph of $y = 10 - 2x$ then use your graphs to find the point of intersection.

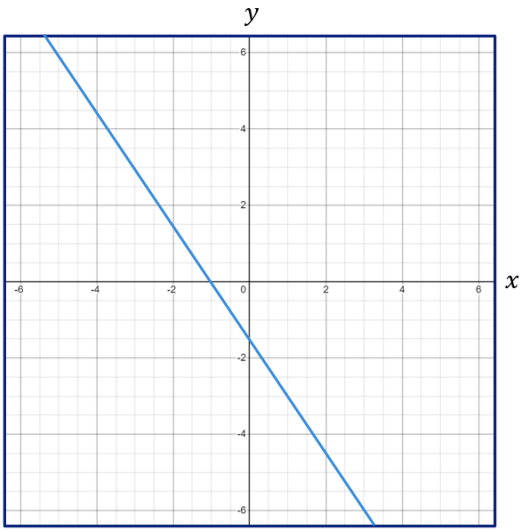
Intersecting Lines - Worksheet

9) The straight line $2y + 3x = 12$ has been drawn on the grid.



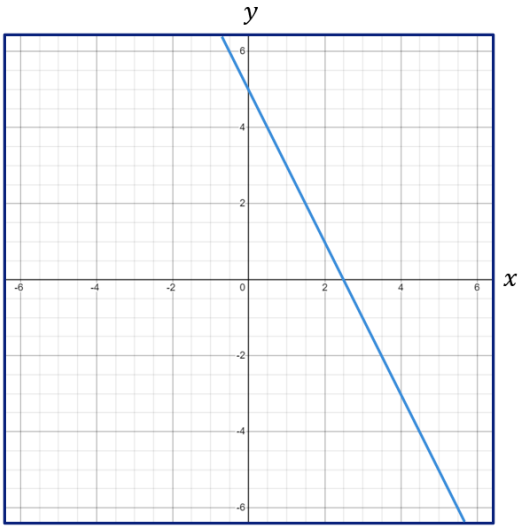
On the same grid, draw the graph of $y = 2x - 1$ then use your graphs to find the point of intersection.

10) The straight line $2y + 3x = -3$ has been drawn on the grid.



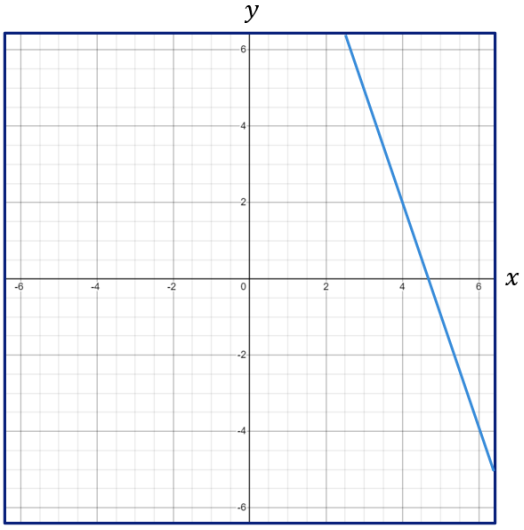
On the same grid, draw the graph of $2y = 12x + 3$ then use your graphs to find the point of intersection.

11) The straight line $y + 2x = 5$ has been drawn on the grid.



On the same grid, draw the graph of $y - 4x = 2$ then use your graphs to find the point of intersection.

12) The straight line $y = 14 - 3x$ has been drawn on the grid.



On the same grid, draw the graph of $y = \frac{1}{2}x - 7$ then use your graphs to find the point of intersection.

Intersecting Lines - Worksheet

Group B - Points of intersection algebraically

Find the point of intersection of the following pairs of simultaneous equations:

1) $2x + 3y = 18$, $6x + 3y = 30$

2) $2x + 3y = 18$, $6x - 3y = 30$

3) $2x + y = 18$, $6x - y = 30$

4) $2x - y = 18$, $6x - y = 30$

5) $y + 2x = 18$, $y + 6x = 30$

6) $y + 2x = -18$, $y + 6x = 30$

7) $2x + 5y = 17$, $3x + y = 6$

8) $2x + 4y = 26$, $3x + y = 14$

9) $7x + 2y = 37$, $2x + y = 11$

10) $5x - 2y = 7$, $3x + y = 13$

11) $3x - 2y = 6$, $2x + y = 11$

12) $4x - 3y = 6$, $6x + y = 20$

Group C - Parallel and perpendicular lines

Compare the line $y = 2x + 8$ to the lines below, decide if they are parallel, perpendicular or neither:

1) $y = 2x + 7$

2) $y = 2x - 7$

3) $y = -2x - 7$

4) $y = -\frac{1}{2}x - 7$

5) $y = -\frac{1}{2}x + 7$

6) $y = -\frac{1}{2}x + 107$

7) $y = \frac{1}{2}x + 107$

8) $y = 2x + 107$

9) $y = 2x - 107$

10) $y = 107 + 2x$

11) $y = 107 - 2x$

12) $y = 107 - \frac{1}{2}x$

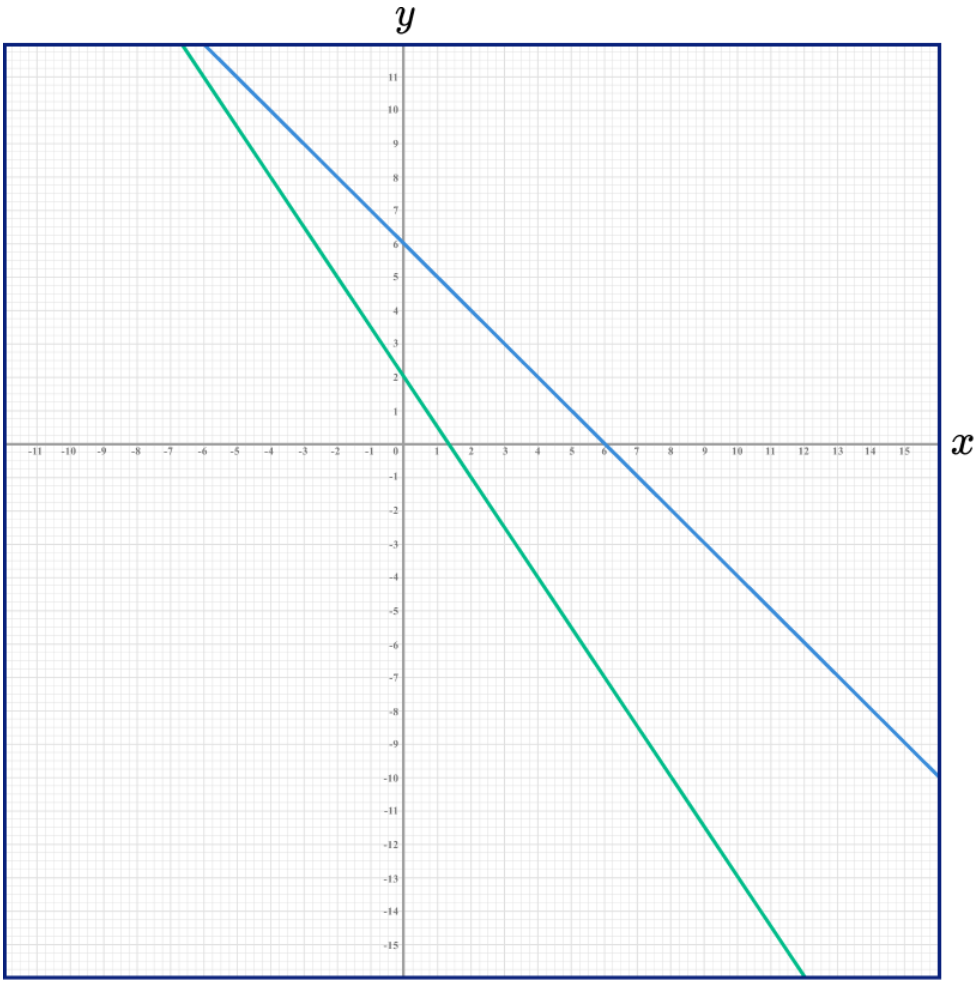
Intersecting Lines - Worksheet

Applied

1) Rob has been asked to solve the simultaneous equations graphically.

$2y + 3x = 4$ and $y = 6 - x$

He has drawn the graphs below.



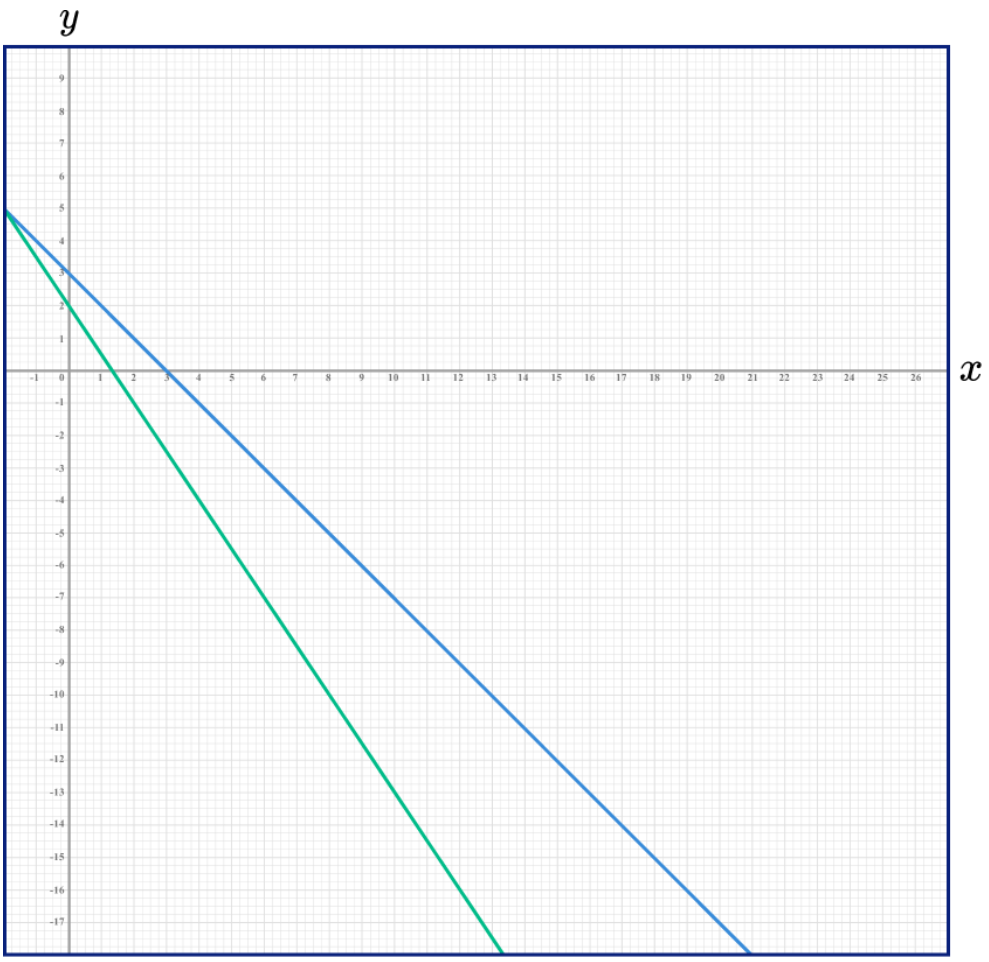
Rob says that there are no solutions to the simultaneous equations because the lines do not intersect. Explain why Rob is incorrect.

Intersecting Lines - Worksheet

2) Aria has been asked to graphically solve the simultaneous equations.

$2y + 3x = 4$ and $y = 3 - x$

She has drawn the graph shown below.



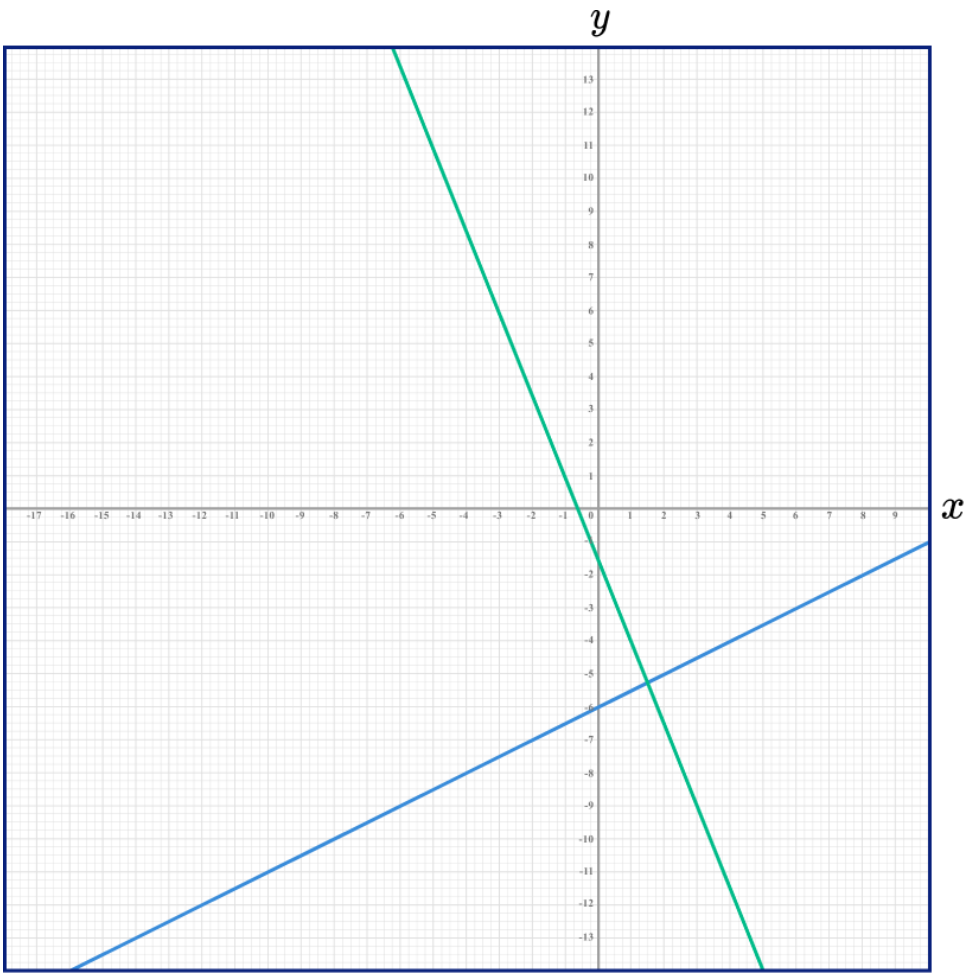
Aria says that there are no solutions to the simultaneous equations because the lines do not intersect. Explain why Aria is incorrect.

Intersecting Lines - Worksheet

3) Esra has been asked to solve the simultaneous equations graphically.

$5x + 2y + 3 = 0$ and $2y = x - 12$

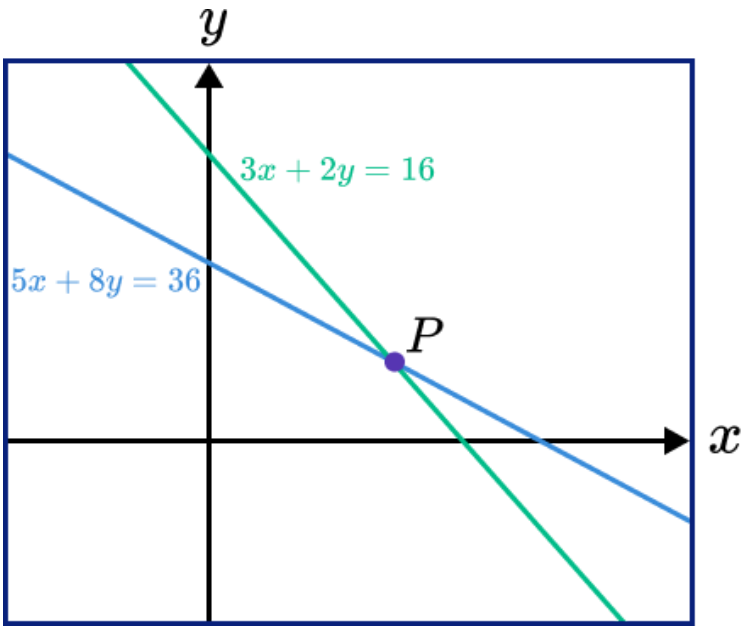
He has drawn the graph below.



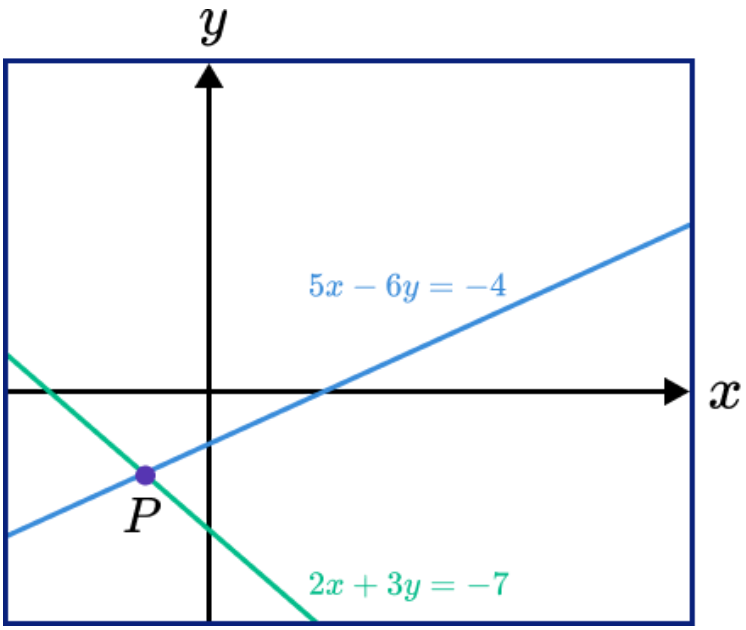
Esra says there are no solutions to the simultaneous equations. Explain why Esra is incorrect.

Intersecting Lines - Worksheet

4) Find the point of intersection, P.

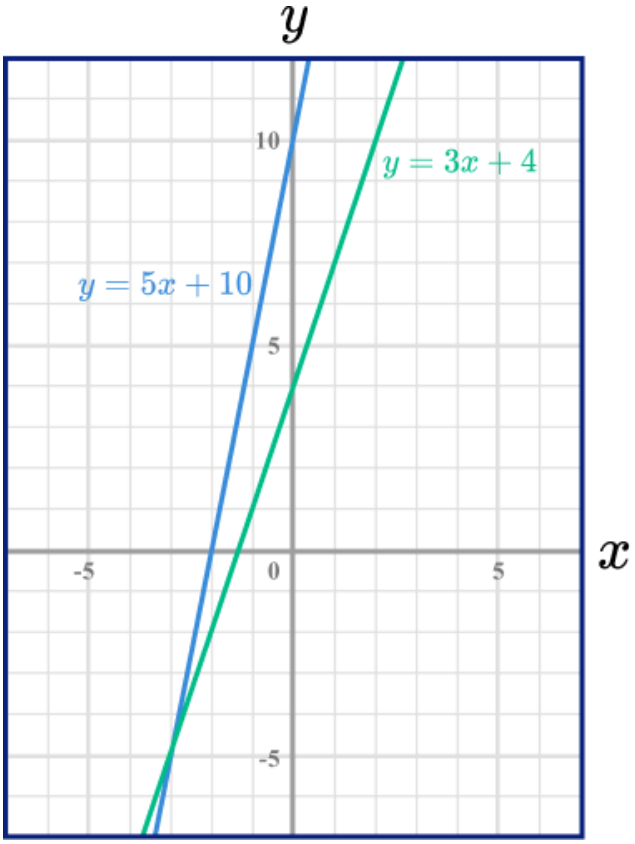


5) Find the point of intersection, P.



Intersecting Lines - Exam Questions

1) **(a)** Write down the coordinates of the point where the graphs of $y = 3x + 4$ and $y = 5x + 10$ intersect.



.....

(1)

(b) Hence, state the solutions to the simultaneous equations.

$y = 3x + 4$

$y = 5x + 10$

x =.....y =.....

(2)

(3 marks)

Intersecting Lines - Exam Questions

2) Line L_1 passes through the points (-1 , 1) and (6 , 15).

Another line L_2 passes through the points (0 , -12) and (3 , 3).

Find the point of intersection.

.....

(5 marks)

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3) Are the following lines parallel, perpendicular or neither?

(a) $y = 2x + 3,\ y = 2x$

.....

(1)

(b) $y = 3x - 6,$
$y = 6 - 3x$

.....

(1)

(c) $y = \frac{1}{2}x + 1,$
$y = -2x$

.....

(1)

(3 marks)

Intersecting Lines - Exam Questions

4) Line L_1 has the equation $2y = 4 - 3x$.

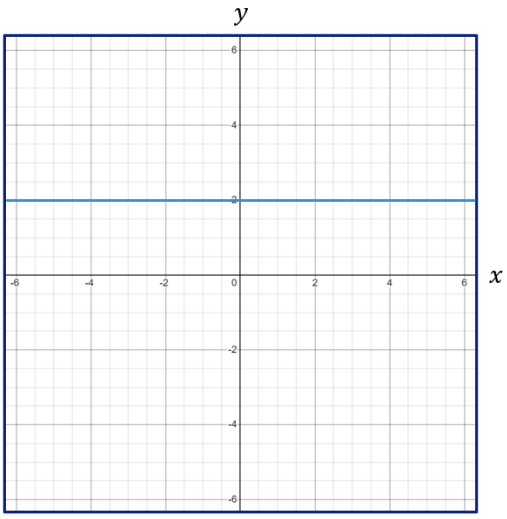
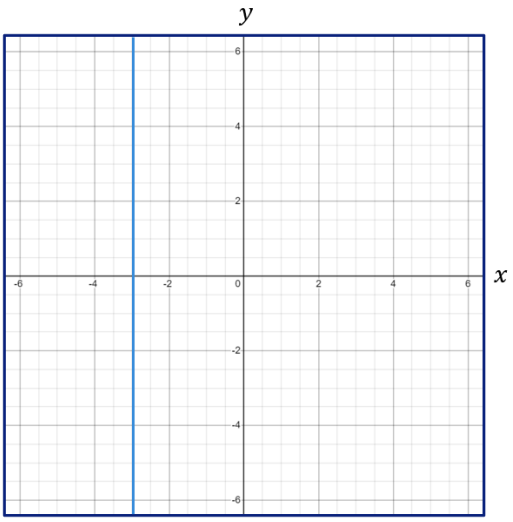
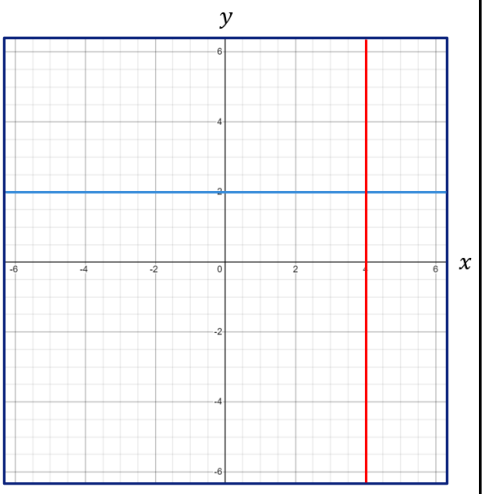
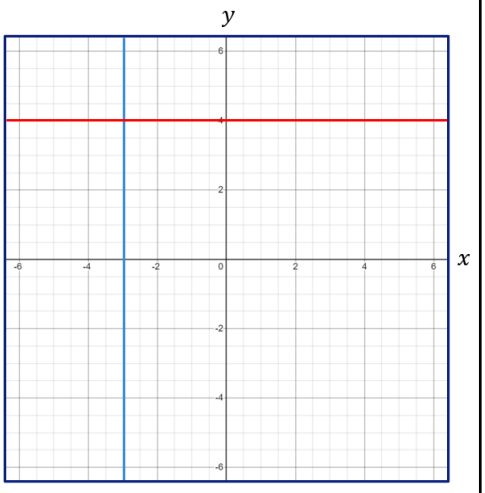
Another line L_2 passes through the points (2 , 5) and (5 , 7).

Are the lines parallel, perpendicular or neither?

.....

(3 marks)

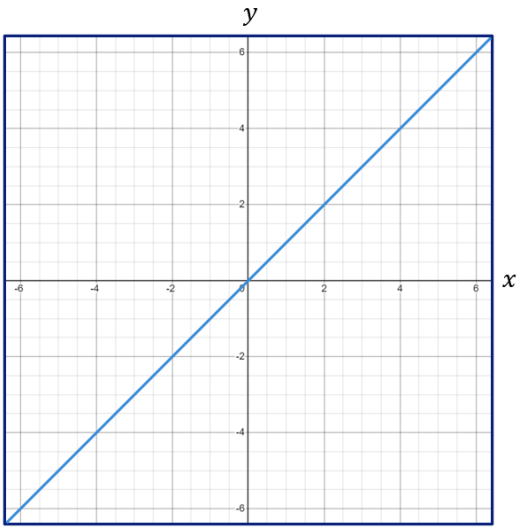
Intersecting Lines - Answers

	Question	Answer
	Skill Questions	
Group A	Find the points of intersection: **1)** The straight line $y = 2$ has been drawn on the grid.  On the same grid, draw the graph of $x = 4$ then use your graphs to find the point of intersection. **2)** The straight line $x = -3$ has been drawn on the grid.  On the same grid, draw the graph of $y = 4$ then use your graphs to find the point of intersection.	**1)** $(4, 2)$  **2)** $(-3, 4)$ 

Intersecting Lines - Answers

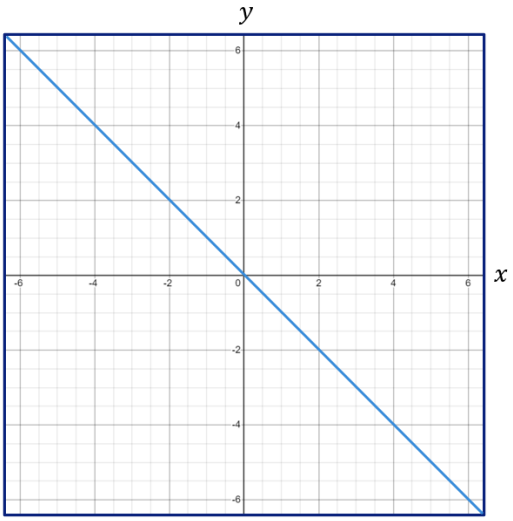
Group A contd

3) The straight line $y = x$ has been drawn on the grid.



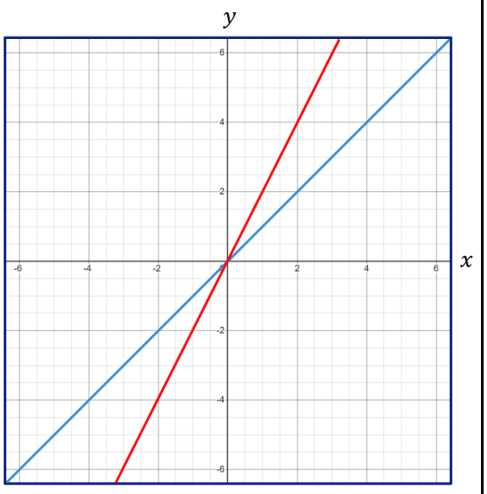
On the same grid, draw the graph of $y = 2x$ then use your graphs to find the point of intersection.

4) The straight line $y = -x$ has been drawn on the grid.

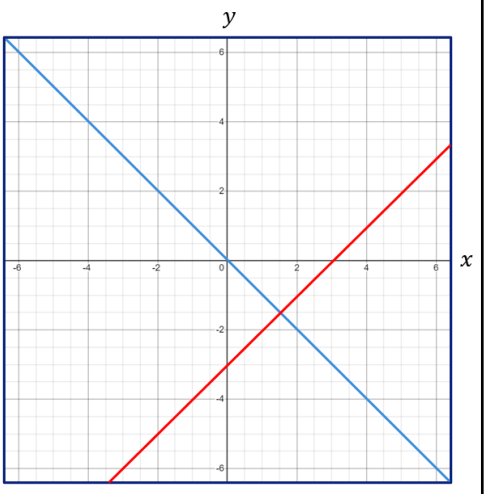


On the same grid, draw the graph of $y = x - 3$ then use your graphs to find the point of intersection.

3) $(0, 0)$



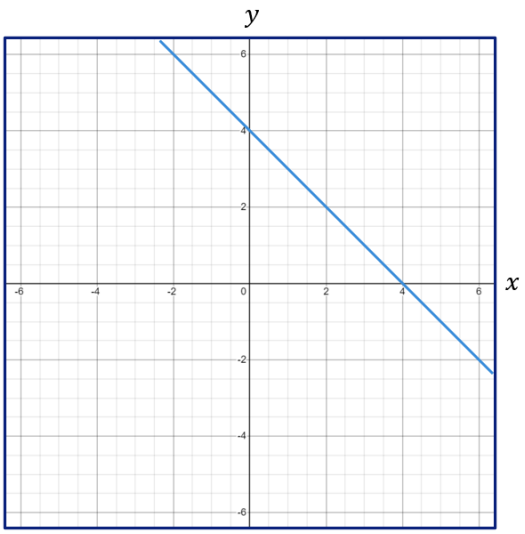
4) $(1.5, -1.5)$



Intersecting Lines - Answers

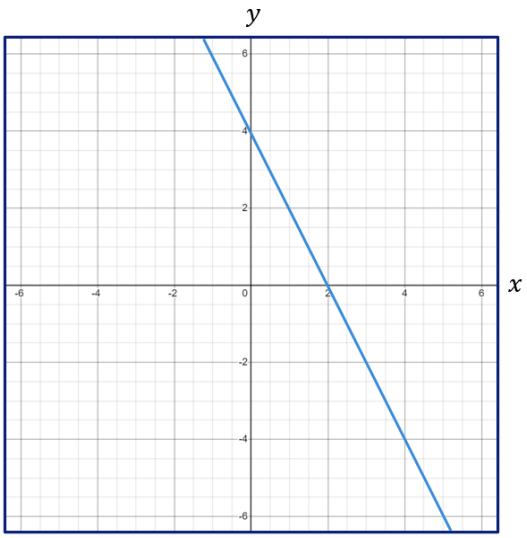
Group A contd

5) The straight line $y = 4 - x$ has been drawn on the grid.



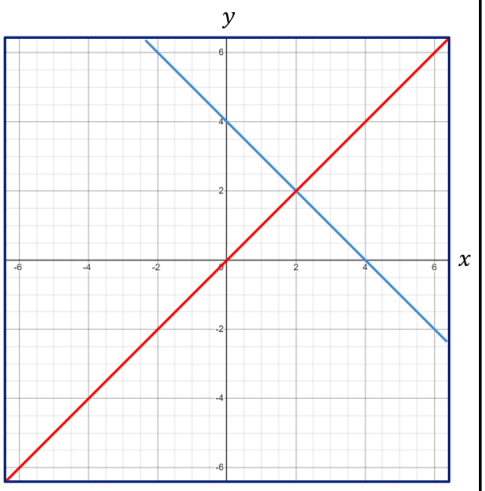
On the same grid, draw the graph of $y = x$ then use your graphs to find the point of intersection.

6) The straight line $y = 4 - 2x$ has been drawn on the grid.

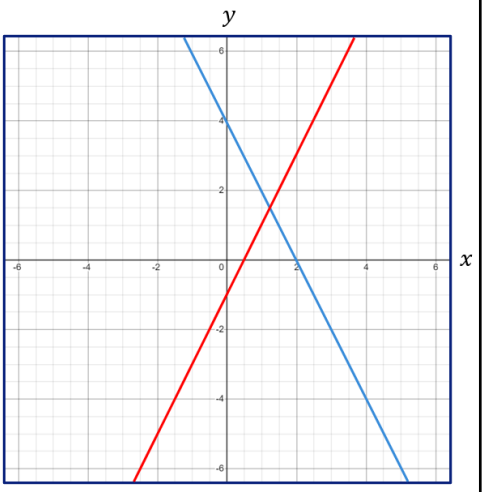


On the same grid, draw the graph of $y = 2x - 1$ then use your graphs to find the point of intersection.

5) $(2, 2)$



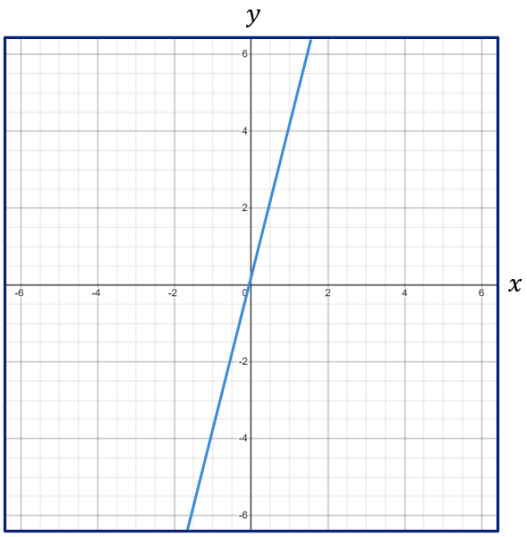
6) $(1.25,\ 1.5)$



Intersecting Lines - Answers

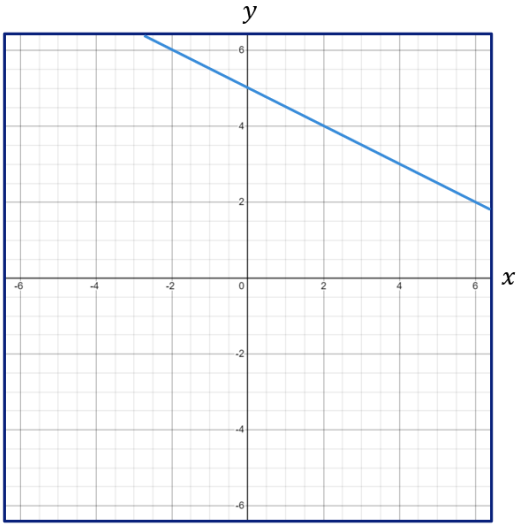
Group A contd

7) The straight line $y = 4x$ has been drawn on the grid.



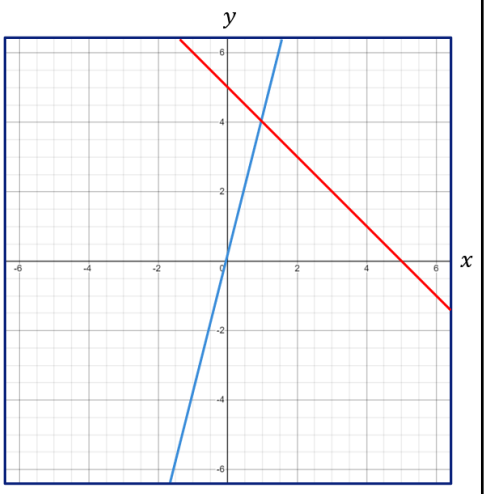
On the same grid, draw the graph of $y = 5 - x$ then use your graphs to find the point of intersection.

8) The straight line $y = -\frac{1}{2}x + 5$ has been drawn on the grid.

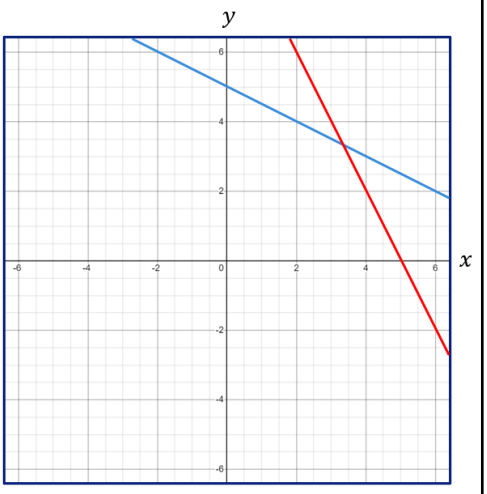


On the same grid, draw the graph of $y = 10 - 2x$ then use your graphs to find the point of intersection.

7) $(1, 4)$



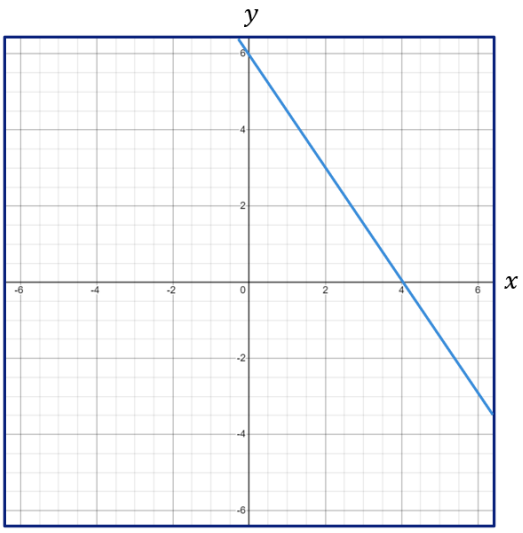
8) $(3.\dot{3},\ 3.\dot{3})$



Intersecting Lines - Answers

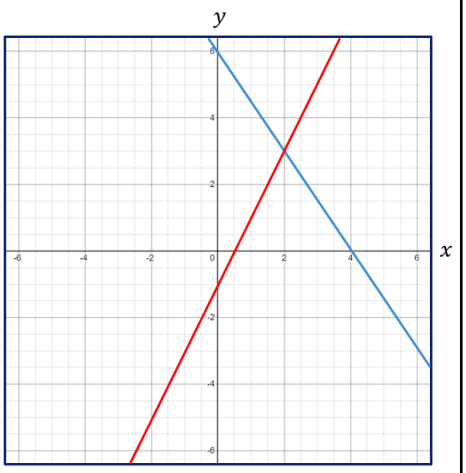
Group A contd

9) The straight line $2y + 3x = 12$ has been drawn on the grid.

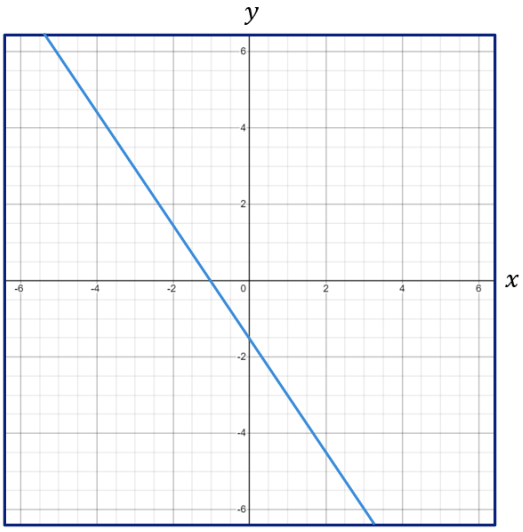


On the same grid, draw the graph of $y = 2x - 1$ then use your graphs to find the point of intersection.

9) $(2, 3)$

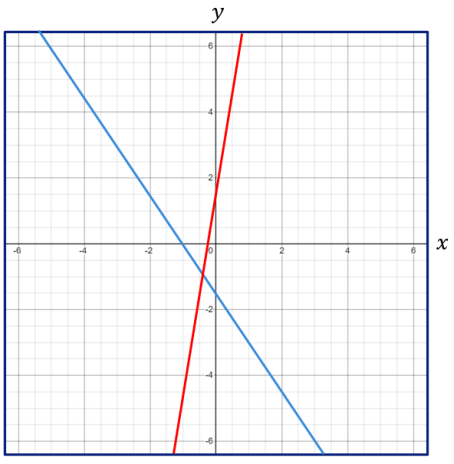


10) The straight line $2y + 3x = -3$ has been drawn on the grid.



On the same grid, draw the graph of $2y = 12x + 3$ then use your graphs to find the point of intersection.

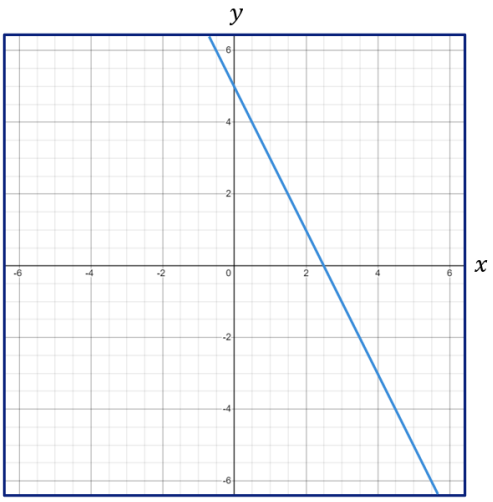
10) $(-0.4, -0.9)$



Intersecting Lines - Answers

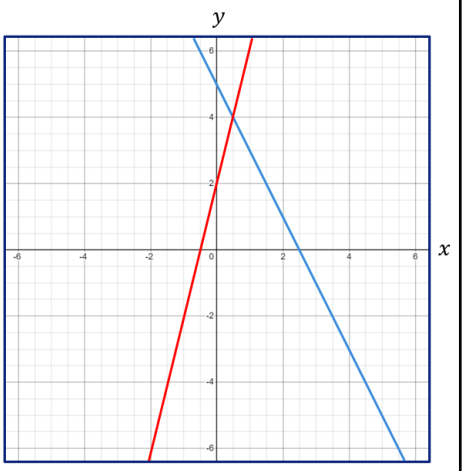
Group A contd

11) The straight line $y + 2x = 5$ has been drawn on the grid.

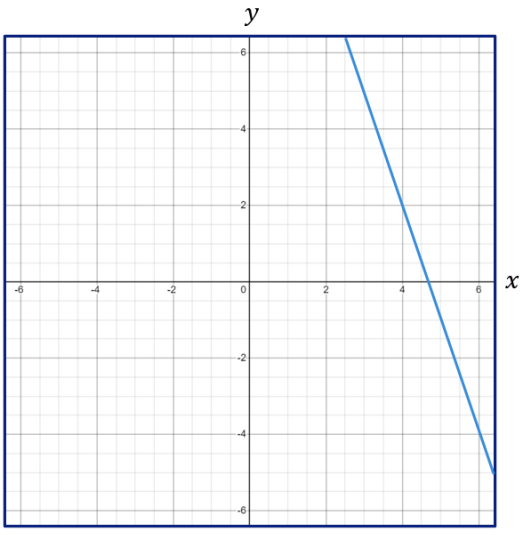


On the same grid, draw the graph of $y - 4x = 2$ then use your graphs to find the point of intersection.

11) $(0.5, 4)$

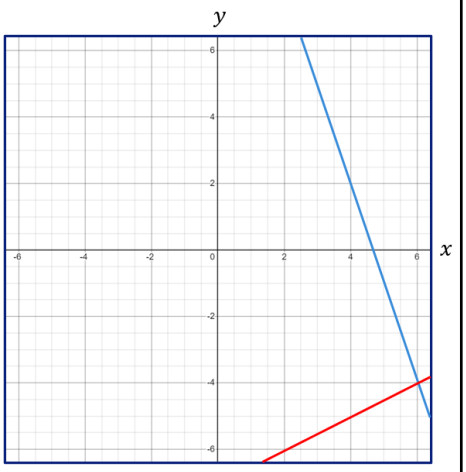


12) The straight line $y = 14 - 3x$ has been drawn on the grid.



On the same grid, draw the graph of $y = \frac{1}{2}x - 7$ then use your graphs to find the point of intersection.

12) $(6, -4)$



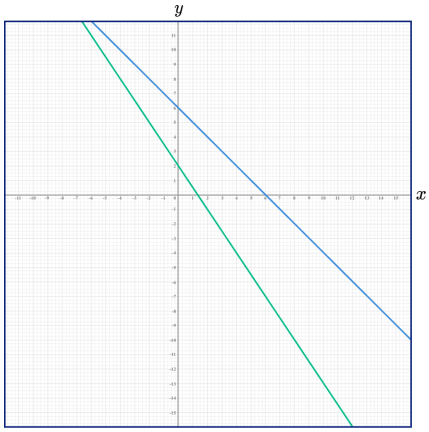
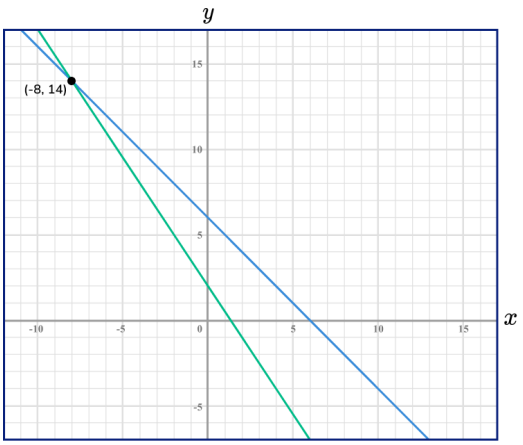
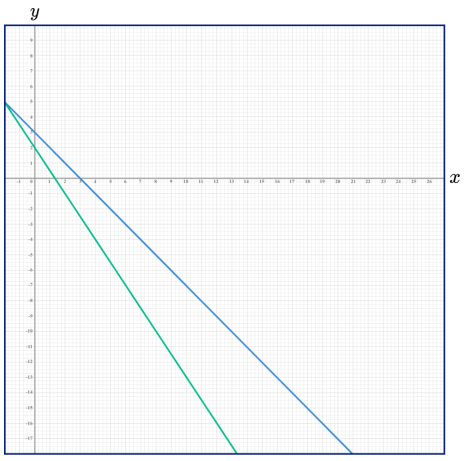
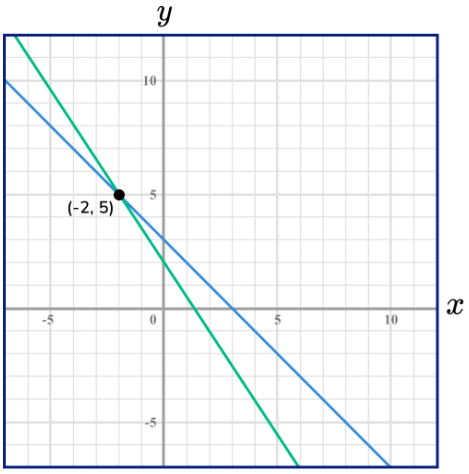
Intersecting Lines - Answers

Group B	Find the point of intersection of the following pairs of simultaneous equations:	
	1) $2x + 3y = 18$ $6x + 3y = 30$	**1)** $(3\,,\,4)$
	2) $2x + 3y = 18$ $6x - 3y = 30$	**2)** $(6\,,\,2)$
	3) $2x + y = 18$ $6x - y = 30$	**3)** $(6\,,\,6)$
	4) $2x - y = 18$ $6x - y = 30$	**4)** $(3\,,\,-12)$
	5) $y + 2x = 18$ $y + 6x = 30$	**5)** $(3\,,\,12)$
	6) $y + 2x = -18$ $y + 6x = 30$	**6)** $(12\,,\,-42)$
	7) $2x + 5y = 17$ $3x + y = 6$	**7)** $(1\,,\,3)$
	8) $2x + 4y = 26$ $3x + y = 14$	**8)** $(3\,,\,5)$
	9) $7x + 2y = 37$ $2x + y = 11$	**9)** $(5\,,\,1)$
	10) $5x - 2y = 7$ $3x + y = 13$	**10)** $(3\,,\,4)$
	11) $3x - 2y = 6$ $2x + y = 11$	**11)** $(4\,,\,3)$
	12) $4x - 3y = 6$ $6x + y = 20$	**12)** $(3\,,\,2)$

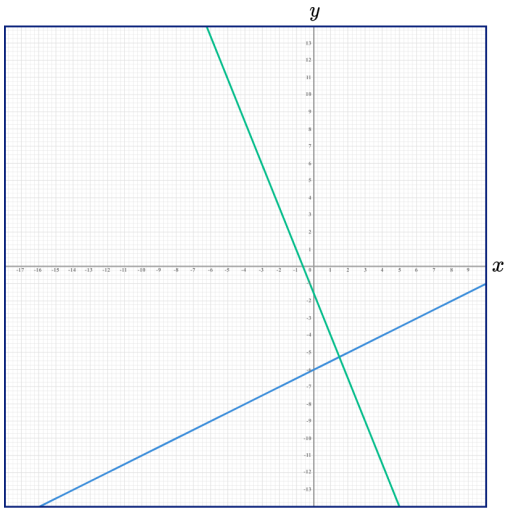
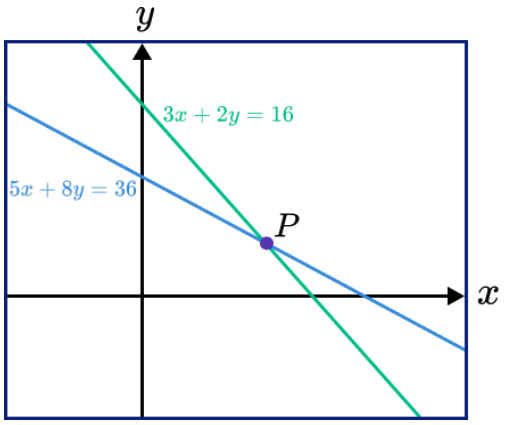
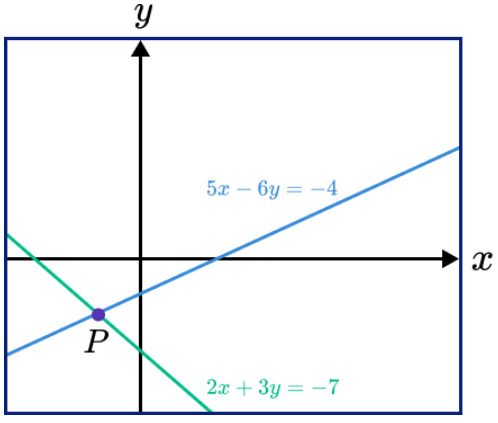
Intersecting Lines - Answers

Group C	Compare the line $y = 2x + 8$ to the lines below, decide if they are parallel, perpendicular or neither:	
	1) $y = 2x + 7$	**1)** Parallel
	2) $y = 2x - 7$	**2)** Parallel
	3) $y = -2x - 7$	**3)** Neither
	4) $y = -\frac{1}{2}x - 7$	**4)** Perpendicular
	5) $y = -\frac{1}{2}x + 7$	**5)** Perpendicular
	6) $y = -\frac{1}{2}x + 107$	**6)** Perpendicular
	7) $y = \frac{1}{2}x + 107$	**7)** Neither
	8) $y = 2x + 107$	**8)** Parallel
	9) $y = 2x - 107$	**9)** Parallel
	10) $y = 107 + 2x$	**10)** Parallel
	11) $y = 107 - 2x$	**11)** Neither
	12) $y = 107 - \frac{1}{2}x$	**12)** Perpendicular

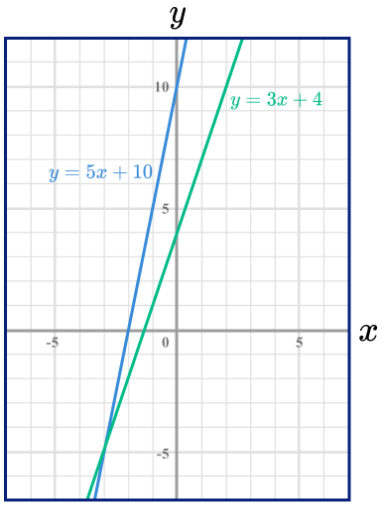
Intersecting Lines - Answers

	Question	Answer
	Applied Questions	
1)	Rob has been asked to solve the simultaneous equations graphically. $2y + 3x = 4$ and $y = 6 - x$ He has drawn the graphs below  Rob says that there are no solutions to the simultaneous equations because the lines do not intersect. Explain why Rob is incorrect.	The lines will intersect, but beyond the axes Rob has drawn. Extending the axes would also be useful.  Solving the simultaneous equations gives the solutions $x = -8$ and $y = 14$ so, Rob is incorrect, the lines will intersect at $(-8, 14)$.
2)	Aria has been asked to graphically solve the simultaneous equations. $2y + 3x = 4$ and $y = 3 - x$ She has drawn the graph shown below  Aria says that there are no solutions to the simultaneous equations because the lines do not intersect. Explain why Aria is incorrect.	The lines will intersect, but beyond the axes Aria has drawn. Extending the axes would also be useful.  Solving the simultaneous equations gives the solutions $x = -2$ and $y = 5$ so, Aria is incorrect, the lines will intersect at $(-2, 5)$.

Intersecting Lines - Answers

3)	Esra has been asked to solve the simultaneous equations graphically. $5x + 2y + 3 = 0$ and $2y = x - 12$ He has drawn the graph below.  Esra says there are no solutions to the simultaneous equations. Explain why Esra is incorrect.	Esra is incorrect because you can clearly see the graphs intersecting at the point $(1.5, -5.25)$.
4)	Find the point of intersection, P.  	$(4, 2)$
5)	Find the point of intersection, P.  	$(-2, -1)$

Intersecting Lines - Mark Scheme

		Question		Answer	
		Exam Questions			
1)	**(a)**	Write down the coordinates of the point where the graphs of $y = 3x + 4$ and $y = 5x + 10$ intersect.  	**(a)**	(-3 , -5)	**(1)**
	(b)	Hence, state the solutions to the simultaneous equations $y = 3x + 4$ $y = 5x + 10$	**(b)**	$x = -3$ $y = -5$	**(1)** **(1)**
2)		Line L_1 passes through the points (-1 , 1) and (6 , 15). Another line L_2 passes through the points (0 , -12) and (3 , 3). Find the point of intersection.		$L_1 \rightarrow y = 2x + 3$ $L_2 \rightarrow y = 5x - 12$ $x = 5$ $y = 13$ (5 , 13)	**(1)** **(1)** **(1)** **(1)** **(1)**
3)	**(a)**	Are the following lines parallel, perpendicular or neither? $y = 2x + 3,\ y = 2x$	**(a)**	Parallel	**(1)**
	(b)	$y = 3x - 6, y = 6 - 3x$	**(b)**	Neither	**(1)**
	(c)	$y = \frac{1}{2}x + 1, y = -2x$	**(c)**	Perpendicular	**(1)**

Intersecting Lines - Mark Scheme

4)		Line L_1 has the equation $2y = 4 - 3x$. Another line L_2 passes through the points (2 , 5) and (5 , 7). Are the lines parallel, perpendicular or neither?		Gradient $L_1 = -\frac{3}{2}$ Gradient $L_2 = \frac{2}{3}$ Perpendicular	**(1)** **(1)** **(1)**