

Linear simultaneous equations on graphs

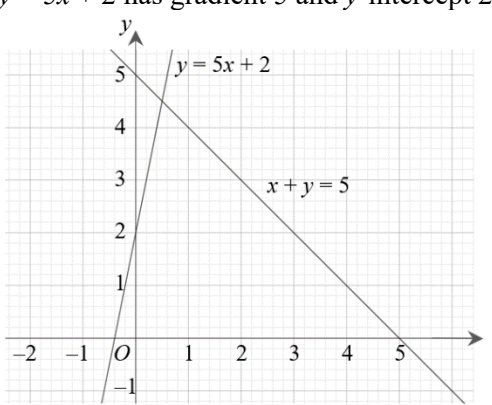
A LEVEL LINKS

Scheme of work: 1c. Equations – quadratic/linear simultaneous

Key points

- You can solve any pair of simultaneous equations by drawing the graph of both equations and finding the point/points of intersection.

Example 1 Solve the simultaneous equations $y = 5x + 2$ and $x + y = 5$ graphically.

<p>$y = 5 - x$</p> <p>$y = 5 - x$ has gradient -1 and y-intercept 5. $y = 5x + 2$ has gradient 5 and y-intercept 2.</p>  <p>Lines intersect at $x = 0.5, y = 4.5$</p> <p>Check: First equation $y = 5x + 2$: $4.5 = 5 \times 0.5 + 2$ YES Second equation $x + y = 5$: $0.5 + 4.5 = 5$ YES</p>	<ol style="list-style-type: none"> Rearrange the equation $x + y = 5$ to make y the subject. Plot both graphs on the same grid using the gradients and y-intercepts. The solutions of the simultaneous equations are the point of intersection. Check your solutions by substituting the values into both equations.
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Practice questions

1 Solve these pairs of simultaneous equations graphically.

a $y = 3x - 1$ and $y = x + 3$

b $y = x - 5$ and $y = 7 - 5x$

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

2 Solve these pairs of simultaneous equations graphically.

a $x + y = 0$ and $y = 2x + 6$

b $4x + 2y = 3$ and $y = 3x - 1$

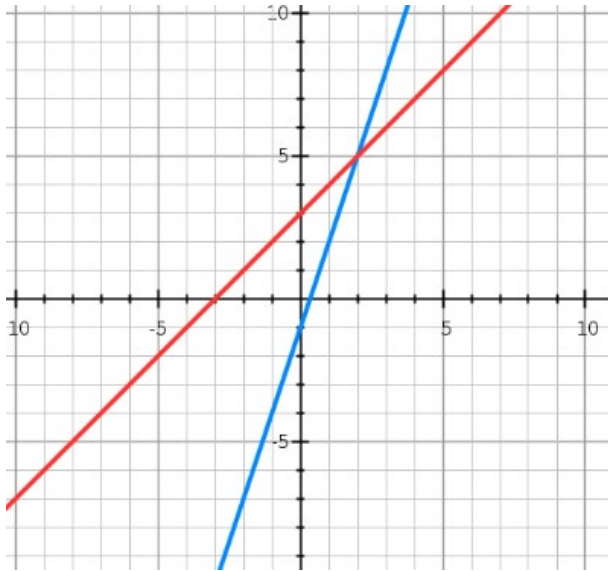
c $2x + y + 4 = 0$ and $2y = 3x - 1$

Hint

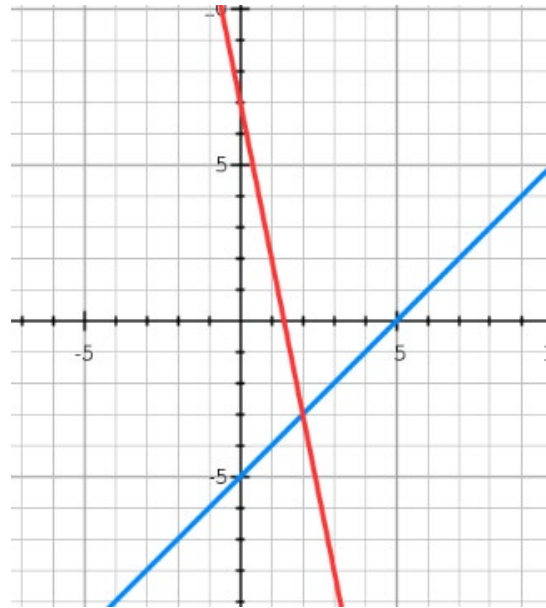
Rearrange the equation to make y the subject.

Answers

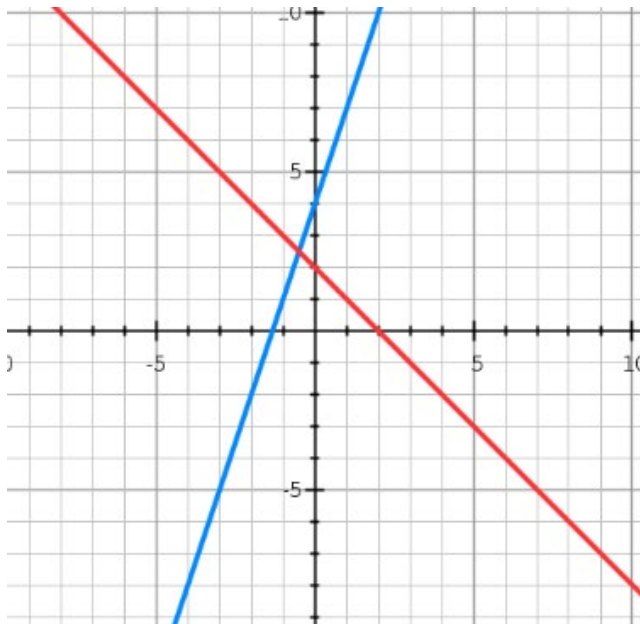
1 a $x = 2, y = 5$



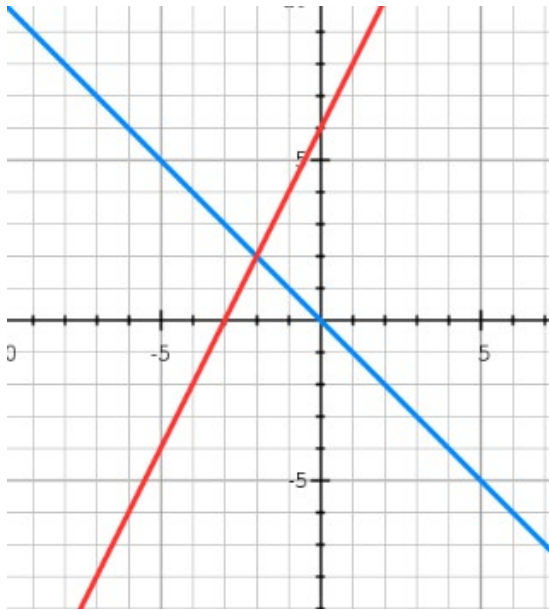
b $x = 2, y = -3$



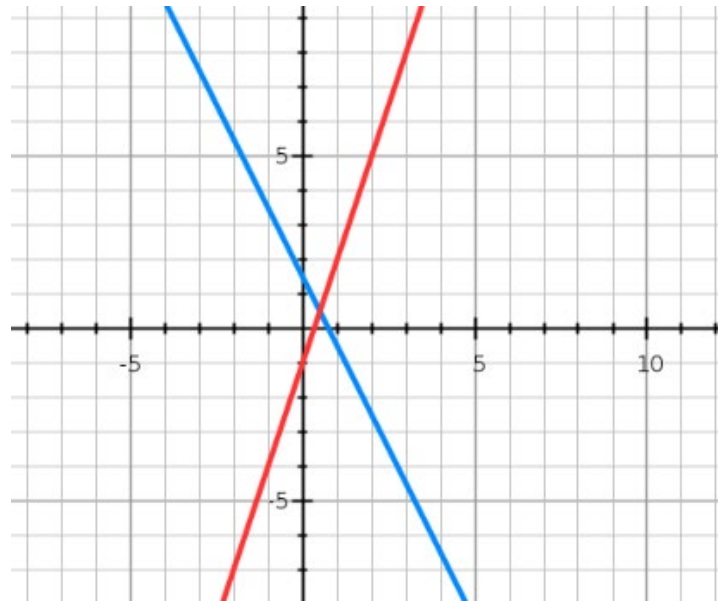
c $x = -0.5, y = 2.5$



2 a $x = -2, y = 2$



b $x = 0.5, y = 0.5$



c $x = -1, y = -2$

