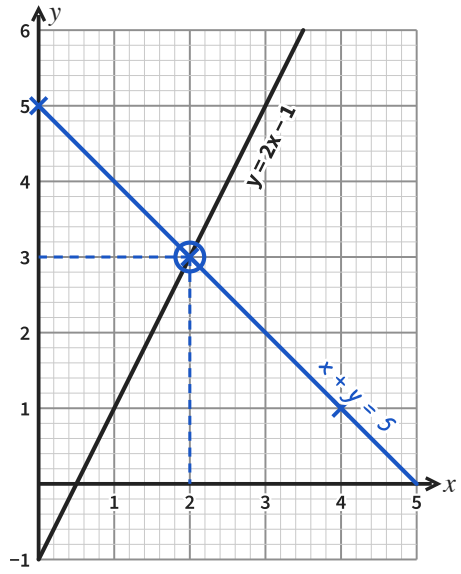
Simultaneous equations: solving with graphs

ANSWERS

1

The line $y = 2x - 1$ is drawn. Draw the line $x + y = 5$.
Solve the simultaneous equations.



$x + y = 5$

x	y
0	5
2	3
4	1

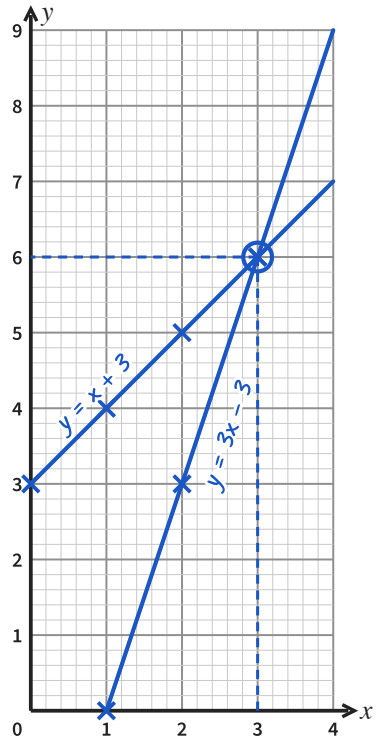
$x =$ 2 $y =$ 3

Check in both equations

3 = 2 × 2 − 1 ✓ 2 + 3 = 5 ✓

2

Draw the lines $y = 3x - 3$ and $y = x + 3$.
Solve the simultaneous equations.



$y = 3x - 3$

x	y
1	0
2	3
3	6

$y = x + 3$

x	y
0	3
1	4
2	5
3	6

$x =$ 3

$y =$ 6

Check in both equations

6 = 3 × 3 − 3 ✓

6 = 3 + 3 ✓

3

Draw $2x + y = 4$ from where it crosses the axes.
Draw $y = x + 1$. Solve the simultaneous equations.

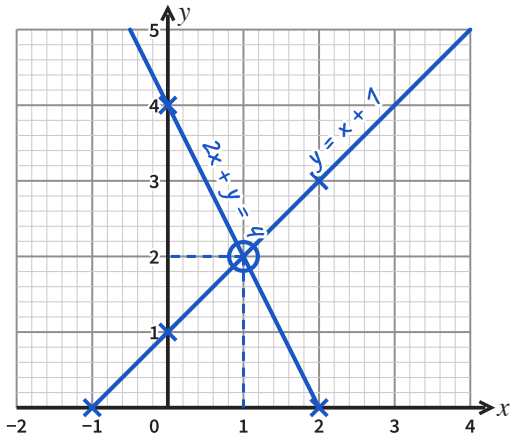
$2x + y = 4$

crosses the y axis at (0, 4)

crosses the x axis at (2, 0)

$y = x + 1$

x	−1	0	2
y	0	1	3



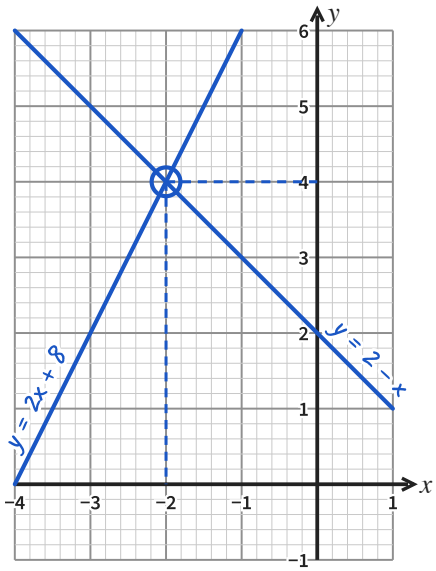
$x =$ 1 $y =$ 2

Check in both equations

2 × 1 + 2 = 4 ✓ 2 = 1 + 1 ✓

4

Draw the lines $y = 2 - x$ and $y = 2x + 8$.
Solve the simultaneous equations.



$x =$ −2

$y =$ 4

Check in both equations

4 = 2 − (−2) ✓

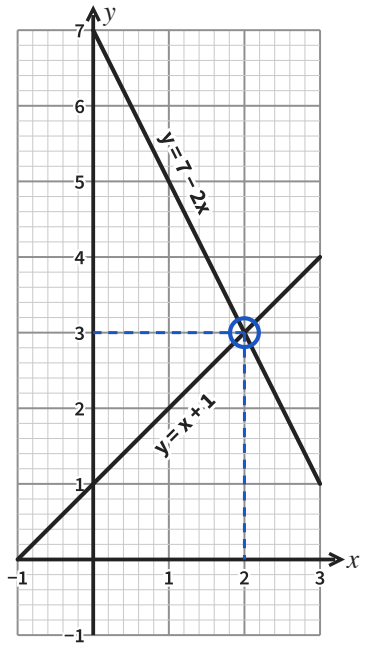
4 = 2 × (−2) + 8 ✓

Simultaneous equations: solving with graphs

ANSWERS

5

The lines $y = x + 1$ and $y = 7 - 2x$ are drawn. Nia says the solution is $x = 3$, $y = 2$. What has Nia done wrong? Write the correct solution.



Nia read up first. Go across first, then up: the lines cross at (2, 3), so $x = 2$ and $y = 3$.

$x =$ 2

$y =$ 3

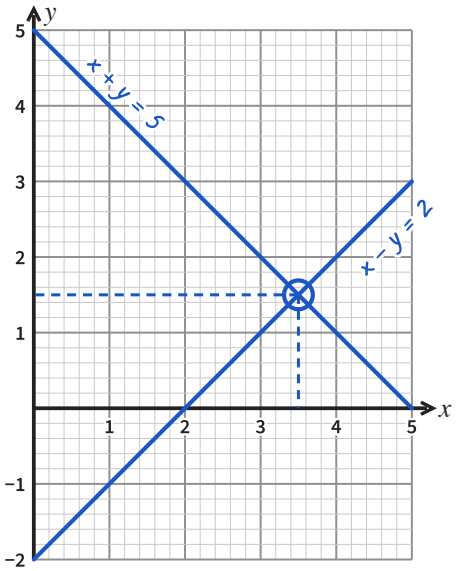
Check in both equations

$3 = 2 + 1$ ✓

$3 = 7 - 2 \times 2$ ✓

6

(a) Draw the lines $x + y = 5$ and $x - y = 2$. Use your graph to estimate the solution. (b) Add the equations to solve them exactly.



(a)

$x \approx$ 3.4 to 3.6

$y \approx$ 1.4 to 1.6

(b)

$2x = 7$

$x = 3.5$,

$3.5 + y = 5$

$x =$ 3.5

$y =$ 1.5

Check in both equations

$3.5 + 1.5 = 5$ ✓ $3.5 - 1.5 = 2$ ✓

7

Draw $2x + 3y = 12$ and $x + y = 5$ from where they cross the axes. Solve the simultaneous equations.

$2x + 3y = 12$

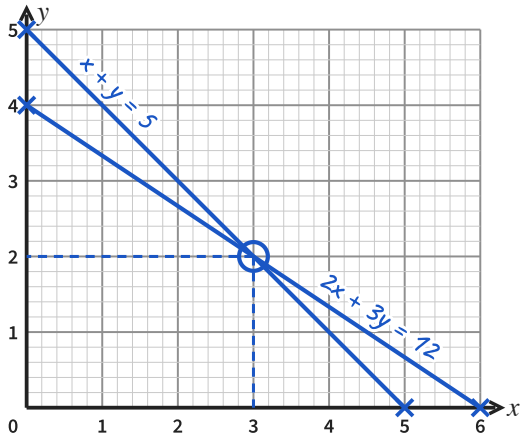
when $x = 0$, $y =$ 4

when $y = 0$, $x =$ 6

$x + y = 5$

when $x = 0$, $y =$ 5

when $y = 0$, $x =$ 5



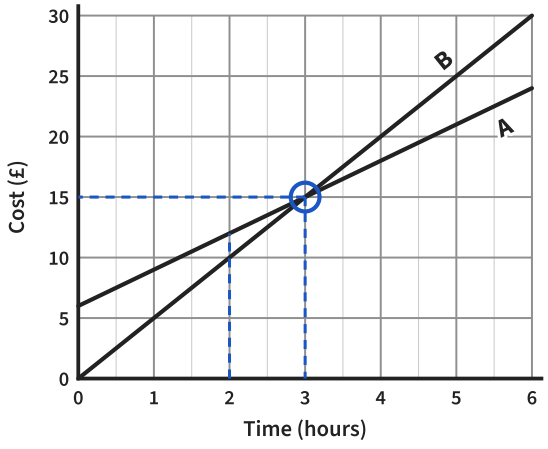
$x =$ 3 $y =$ 2

Check in both equations

$2 \times 3 + 3 \times 2 = 12$ ✓ $3 + 2 = 5$ ✓

8

Plan A hires out scooters for £6 plus £3 an hour.
Plan B charges £5 an hour. The graph shows both plans.
(a) After how many hours do they cost the same?
(b) Which plan is cheaper for a 2 hour ride?
Give both costs.



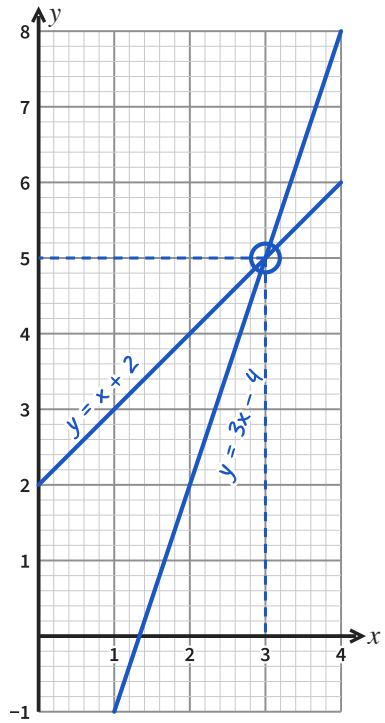
(a) 3 hours (both £15)

(b) plan B (£10, against £12 on plan A)

Simultaneous equations: solving with graphs *further practice* ANSWERS

9

Solve the simultaneous equations $y = 3x - 4$ and $y = x + 2$ by drawing their lines.



$x =$ 3

$y =$ 5

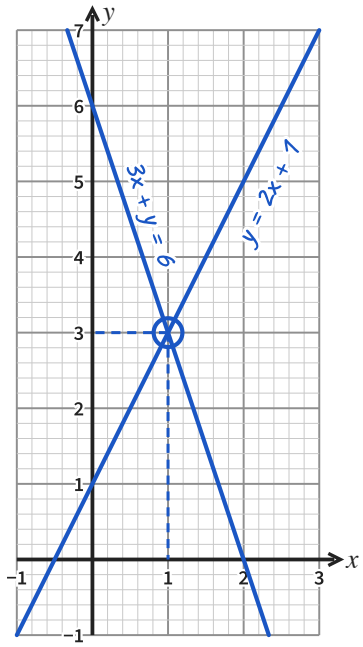
Check in both equations

$5 = 3 \times 3 - 4$ ✓

$5 = 3 + 2$ ✓

10

Solve the simultaneous equations $3x + y = 6$ and $y = 2x + 1$ by drawing their lines.



$x =$ 1

$y =$ 3

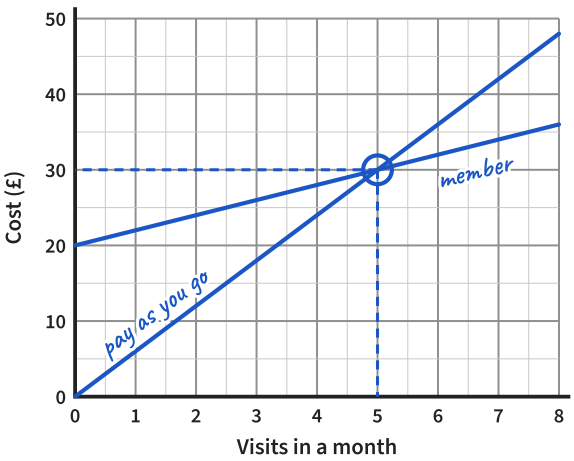
Check in both equations

$3 \times 1 + 3 = 6$ ✓

$3 = 2 \times 1 + 1$ ✓

11

A gym charges £6 a visit, so $C = 6v$. Members pay £20 a month plus £2 a visit, so $C = 2v + 20$. Draw both lines.
(a) For how many visits is the cost the same? (b) Which is cheaper for 3 visits?

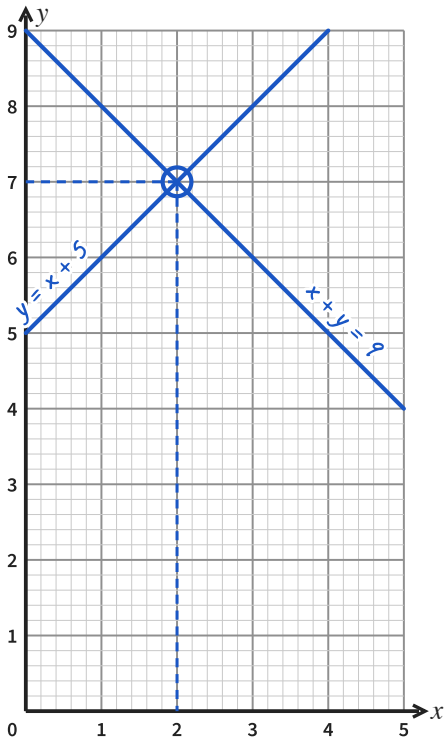


(a) 5 visits (both £30)

(b) pay as you go (£18, against £26)

12

Two numbers x and y add up to 9. y is 5 more than x.
Draw the lines $x + y = 9$ and $y = x + 5$.
Find the two numbers.



$x =$ 2

$y =$ 7

Check in both equations

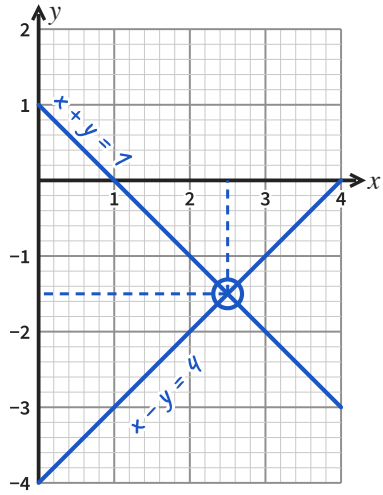
$2 + 7 = 9$ ✓

$7 = 2 + 5$ ✓

Simultaneous equations: solving with graphs *further practice* ANSWERS

13

(a) Draw the lines $x + y = 1$ and $x - y = 4$. Use your graph to estimate the solution. (b) Add the equations to solve them exactly.



(a)

$x \approx$ 2.4 to 2.6

$y \approx$ −1.4 to −1.6

(b)

$2x = 5$

$x = 2.5$,

$2.5 + y = 1$

$x =$ 2.5

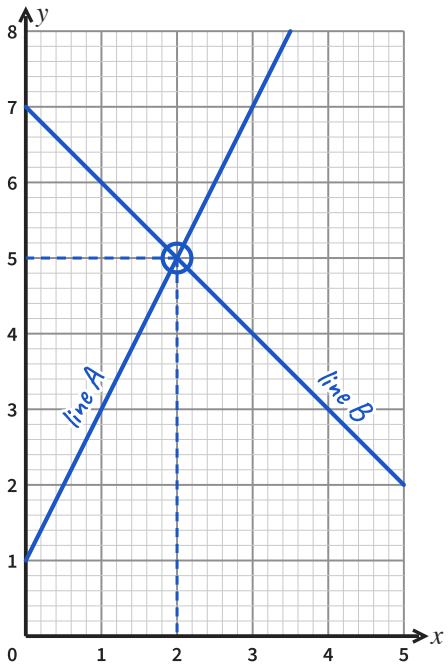
$y =$ −1.5

Check in both equations

$2.5 + (-1.5) = 1$ ✓ $2.5 - (-1.5) = 4$ ✓

14

Line A has gradient 2 and crosses the y axis at 1.
Line B has gradient −1 and crosses the y axis at 7.
Draw both lines. Write their equations and find where they cross.



A: $y = 2x + 1$

B: $y = 7 - x$

$x =$ 2

$y =$ 5

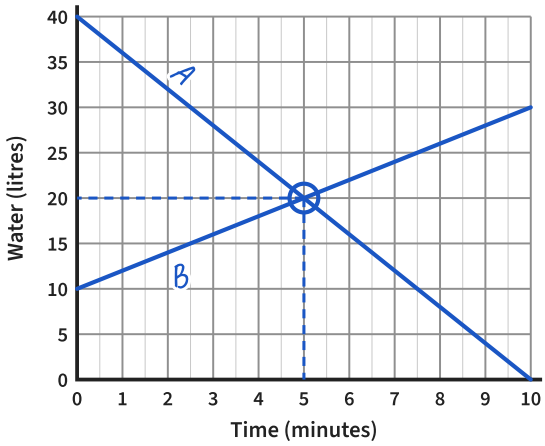
Check in both equations

$5 = 2 \times 2 + 1$ ✓

$5 = 7 - 2$ ✓

15

Tank A holds 40 litres and drains at 4 litres a minute, so $V = 40 - 4t$. Tank B holds 10 litres and fills at 2 litres a minute, so $V = 10 + 2t$. Draw both lines. (a) When do they hold the same amount? (b) How much more is in tank B after 8 minutes?

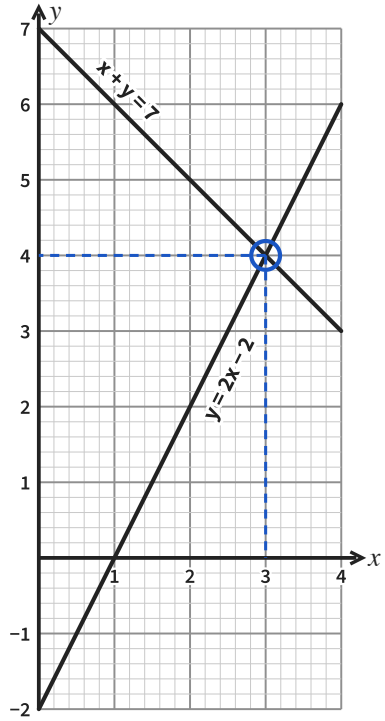


(a) after 5 minutes (both 20 litres)

(b) 18 litres (26 against 8)

16

The lines $y = 2x - 2$ and $x + y = 7$ are drawn. Sam says the solution is $x = 1$, $y = 0$. Explain what Sam has done wrong. Write the correct solution.



Sam read where one line crosses the x axis. The solution is where both lines cross, (3, 4).

$x =$ 3

$y =$ 4

Check in both equations

$4 = 2 \times 3 - 2$ ✓

$3 + 4 = 7$ ✓