**(1)**

What values could fill the gap so that the quadratic factorises nicely?

**(2)**

What must fill the gap if the point $(2, 15)$ lies on the curve?

**(3)**

Fill in the gap if the graph is symmetrical about the $y$-axis.

**(8)**

As the value in the gap changes, what curve does the parabola's vertex trace out?

# Quadratics 1

$$y = x^2 + \square x - 9$$

**(4)**

Fill the gap in two different ways to make the minimum value of $y$ equal $-13$.

**(7)**

What could fill the gap if the difference between the two roots is $6.5$?

**(6)**

Fill the gap in two different ways to make $y = x - 10$ a tangent to the curve.

**(5)**

What point always lies on the curve, whatever number fills in the gap?

**(1)**

What values could fill the gap so that the quadratic factorises nicely?

$\boxed{8}$ or $\boxed{0}$ or $\boxed{-8}$

**(2)**

What must fill the gap if the point $(2, 15)$ lies on the curve?

$\boxed{10}$

**(3)**

Fill in the gap if the graph is symmetrical about the $y$-axis.

$\boxed{0}$

**(8)**

As the value in the gap changes, what curve does the parabola's vertex trace out?

$y = -x^2 - 9$

# Quadratics 1

$$y = x^2 + \square x - 9$$

Answers!

**(4)**

Fill the gap in two different ways to make the minimum value of $y$ equal $-13$.

$\boxed{4}$ or $\boxed{-4}$

**(7)**

What could fill the gap if the difference between the two roots is $6.5$?

$\boxed{2.5}$ or $\boxed{-2.5}$

**(6)**

Fill the gap in two different ways to make $y = x - 10$ a tangent to the curve.

$\boxed{3}$ or $\boxed{-1}$

**(5)**

What point always lies on the curve, whatever number fills in the gap?

$(0, -9)$

**(1)**

Fill the gap so that the $y$-intercept of the curve is at $(0, 36)$.

**(2)**

Fill the gap so that $y \geq 0$ for all values of $x$.

**(3)**

Find the minimum value of $y$ if the curve goes through the point $(11, 12)$.

**(8)**

What values could go in the gap if the line $y = -1$ intersects the curve twice?

# Quadratics 2

$$y = (x - \square)(x - 9)$$

**(4)**

Fill the gap if the graph has equation $y = x^2 - 4x$ after being translated by the vector $\begin{pmatrix} -4 \\ 5 \end{pmatrix}$.

**(7)**

Find two ways to fill the gap if the line $x + y = 5$ is a tangent to the curve.

**(6)**

Fill the gap so that the curve has the same line of symmetry as $y = x^2 - 15x + 60$.

**(5)**

Fill the gap so that the curve has the same roots as $y = 4x^2 - 41x + 45$.

**(1)**

Fill the gap so that the $y$-intercept of the curve is at $(0, 36)$.

$\boxed{4}$

**(2)**

Fill the gap so that $y \geq 0$ for all values of $x$.

$\boxed{9}$

**(3)**

Find the minimum value of $y$ if the curve goes through the point $(11, 12)$.

$\boxed{5}$

**(8)**

What values could go in the gap if the line $y = -1$ does not intersect the curve?

$7 < \square < 11$

# Quadratics 2

$$y = (x - \square)(x - 9)$$

Answers!

**(4)**

Fill the gap if the graph has equation $y = x^2 - 4x$ after being translated by the vector $\begin{pmatrix} -4 \\ 5 \end{pmatrix}$.

$\boxed{3}$

**(7)**

Find two ways to fill the gap if the line $x + y = 5$ is a tangent to the curve.

$\boxed{6}$ or $\boxed{14}$

**(6)**

Fill the gap so that the curve has the same line of symmetry as $y = x^2 - 15x + 60$.

$\boxed{6}$

**(5)**

Fill the gap so that the curve has the same roots as $y = 4x^2 - 41x + 45$.

$\boxed{1.25}$

**(1)**

Find two numbers to fill the gap if the point $(12, 7)$ lies on the curve.

**(2)**

Find two numbers to fill the gap if one of the roots of the curve is $3$.

**(3)**

What is the minimum value of $y$? Explain your answer.

**(8)**

Show that the difference between the two roots of the curve is always $6$.

# Quadratics 3

$$y = (x - \square)^2 - 9$$

**(4)**

What values could fill the gap so that the curve has two negative roots?

**(7)**

Find two numbers to fill the gap if the vertex of the curve is $15$ units from the origin.

**(6)**

Fill the gap if the reflection of the curve in the line $x = 5$ has equation $y = x^2 - 6x$.

**(5)**

What must fill the gap if the line $y = -18x$ intersects the curve at its vertex?

**(1)**

Find two numbers to fill the gap if the point $(12, 7)$ lies on the curve.

$\boxed{8}$ or $\boxed{16}$

**(2)**

Find two numbers to fill the gap if one of the roots of the curve is $3$.

$\boxed{0}$ or $\boxed{6}$

**(3)**

What is the minimum value of $y$? Explain your answer.

$-9$, e.g. because $(x - \square)^2 \geq 0$

**(8)**

Show that the difference between the two roots of the curve is always $6$.

(many different methods possible)

# Quadratics 3

$$y = (x - \square)^2 - 9$$

## Answers!

**(4)**

What values could fill the gap so that the curve has two negative roots?

$\square < -3$

**(7)**

Find two numbers to fill the gap if the vertex of the curve is $15$ units from the origin.

$\boxed{-12}$ or $\boxed{12}$

**(6)**

Fill the gap if the reflection of the curve in the line $x = 5$ has equation $y = x^2 - 6x$.

$\boxed{7}$

**(5)**

What must fill the gap if the line $y = -18x$ intersects the curve at its vertex?

$\boxed{0.5}$