

## Sketching Parabolas

Q. How can you sketch the graph of a parabola quickly ?

A. Find out where it crosses each axis.

Example  $y = x^2 - 2x - 8$

On the y-axis  $x = \underline{\quad}$  so  $y = \underline{\quad}$

The graph crosses the y-axis at (  $\underline{\quad}$  ,  $\underline{\quad}$  )

Factorise  $y = x^2 - 2x - 8$

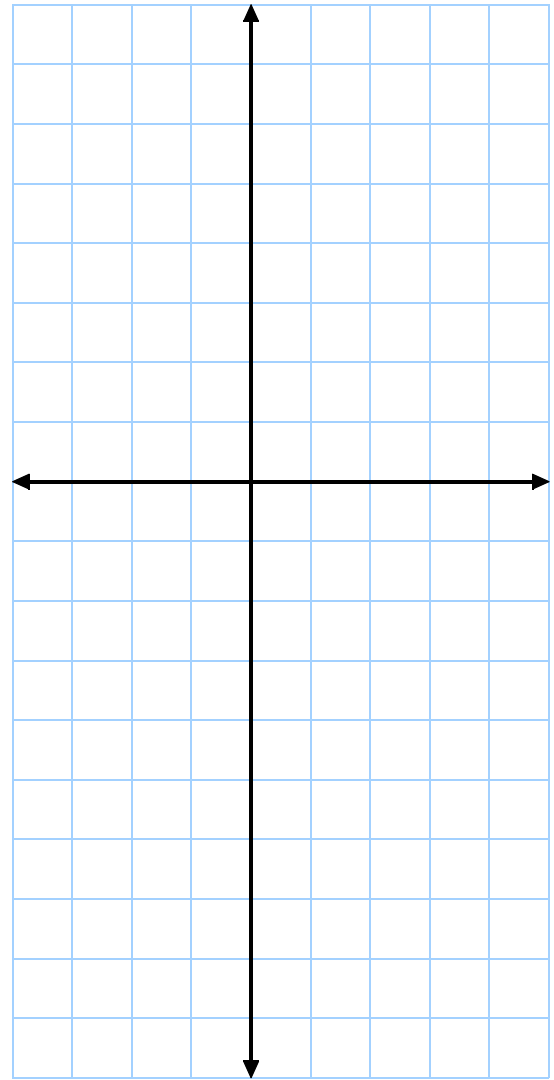
On the x-axis  $y = \underline{\quad}$

For y to have this value  $x = \underline{\quad}$  or  $x = \underline{\quad}$

The graph crosses the x-axis

at (  $\underline{\quad}$  ,  $\underline{\quad}$  ) and (  $\underline{\quad}$  ,  $\underline{\quad}$  )

Mark the three points on the grid.



The parabola is **symmetrical**. Draw the line of symmetry.

The equation of the line of symmetry is  $\underline{\hspace{2cm}}$

At the 'bottom' of the parabola y has its **minimum** value.

The co-ordinates of the **minimum point** are (  $\underline{\quad}$  ,  $\underline{\quad}$  )

## Sketching Parabolas

$$y = x^2 + 2x - 15$$

On the y-axis  $x = \underline{\hspace{2cm}}$  so  $y = \underline{\hspace{2cm}}$

The graph crosses the y-axis at (  $\underline{\hspace{2cm}}$  ,  $\underline{\hspace{2cm}}$  )

**Factorise**  $y = x^2 + 2x - 15$

On the x-axis  $y = \underline{\hspace{2cm}}$

For y to have this value  $x = \underline{\hspace{2cm}}$  or  $x = \underline{\hspace{2cm}}$

The graph crosses the x-axis

at (  $\underline{\hspace{2cm}}$  ,  $\underline{\hspace{2cm}}$  ) and (  $\underline{\hspace{2cm}}$  ,  $\underline{\hspace{2cm}}$  )

Mark the three points on the grid.

The parabola is **symmetrical**.

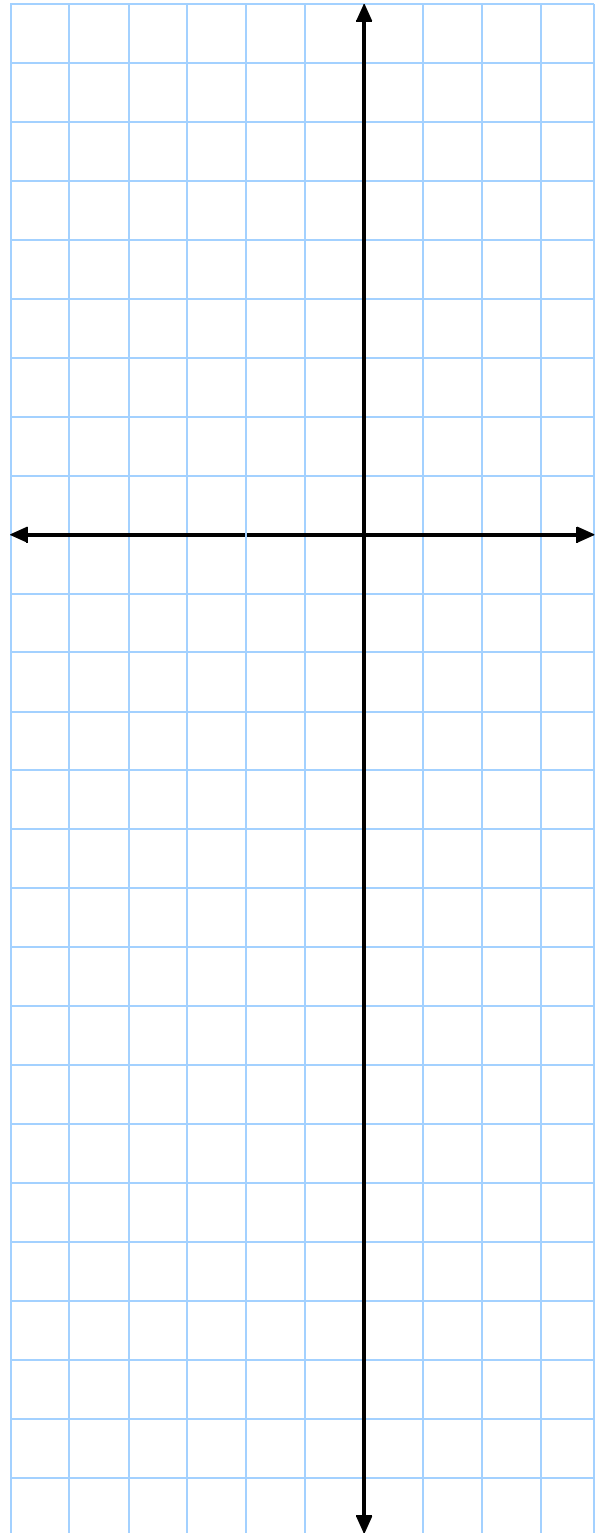
Draw the line of symmetry.

The equation of the line of symmetry is  $\underline{\hspace{4cm}}$

At the 'bottom' of the parabola  
y has its **minimum** value.

The co-ordinates of the **minimum point**

are (  $\underline{\hspace{2cm}}$  ,  $\underline{\hspace{2cm}}$  )



## Sketching Parabolas

Q. How can you sketch the graph of a parabola quickly?

A. Find out where it crosses each axis.

Example  $y = x^2 - 2x - 8$

On the y-axis  $x = 0$  so  $y = -8$

The graph crosses the y-axis at  $(0, -8)$

Factorise  $y = x^2 - 2x - 8$

$$y = (x + 2)(x - 4)$$

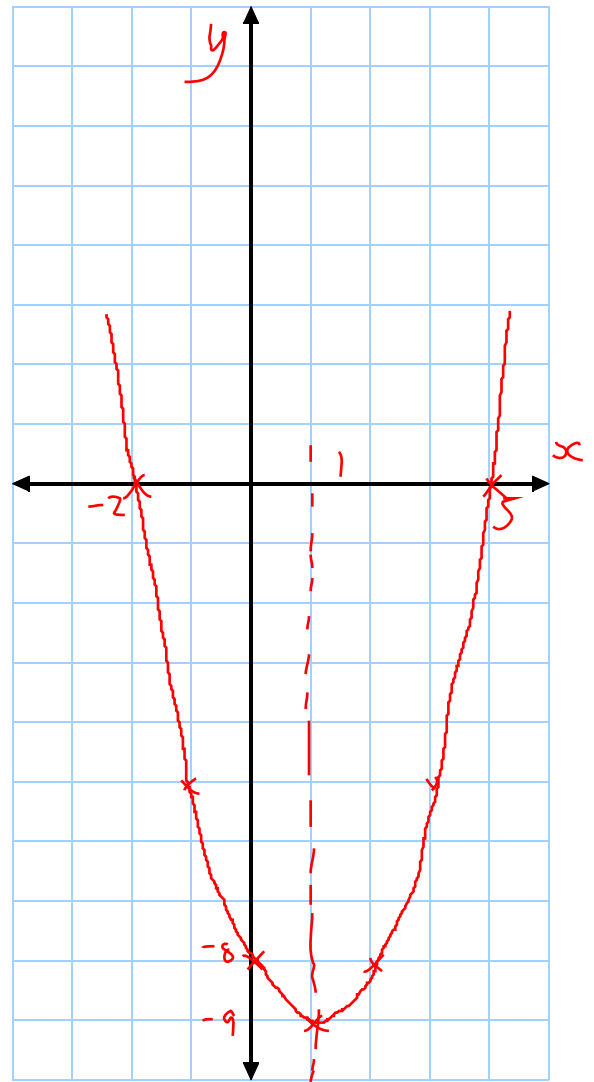
On the x-axis  $y = 0$

For  $y$  to have this value  $x = -2$  or  $x = 4$

The graph crosses the x-axis

at  $(-2, 0)$  and  $(4, 0)$

Mark the three points on the grid.



The parabola is **symmetrical**. Draw the line of symmetry.

The equation of the line of symmetry is  $x = 1$

At the 'bottom' of the parabola  $y$  has its **minimum** value.

The co-ordinates of the **minimum point** are  $(1, -9)$

$$x = 1$$

$$y = x^2 - 2x - 8$$

$$y = 1^2 - 2 \times 1 - 8 = 1 - 2 - 8 = -9$$

## Sketching Parabolas

$$y = x^2 + 2x - 15$$

On the y-axis  $x = \underline{0}$  so  $y = \underline{-15}$

The graph crosses the y-axis at  $(\underline{0}, \underline{-15})$

**Factorise**  $y = x^2 + 2x - 15$

$$y = (x + 5)(x - 3)$$

On the x-axis  $y = \underline{0}$

For  $y$  to have this value  $x = \underline{-5}$  or  $x = \underline{3}$

The graph crosses the x-axis

at  $(\underline{-5}, \underline{0})$  and  $(\underline{3}, \underline{0})$

Mark the three points on the grid.

The parabola is **symmetrical**.

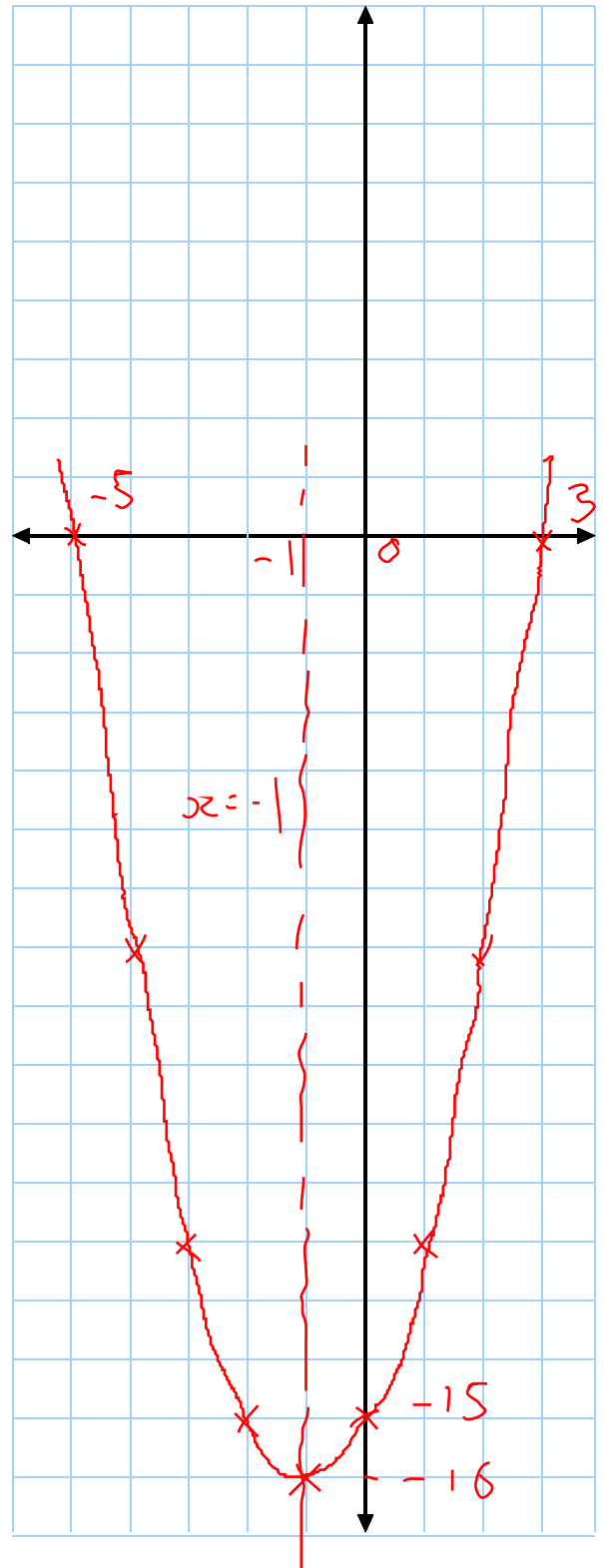
Draw the line of symmetry.

The equation of the line of symmetry is  $\underline{x = -1}$

At the 'bottom' of the parabola  
 $y$  has its **minimum** value.

The co-ordinates of the **minimum point**

are  $(\underline{-1}, \underline{-16})$



$$\begin{aligned}x &= -1 \\y &= (-1)^2 + 2x(-1) - 15 \\&= 1 - 2 - 15 \\&= -16\end{aligned}$$