

Consider the graph of the equation

$$y^2 = x + 4$$

and answer the following questions about it. For each part, either show what equations you use to answer it or draw a graph in which the answer can clearly be seen.

- 1 Is the graph symmetric with respect to the  $x$ -axis?

I change  $y$  to  $-y$ , simplify, and compare with the original:

$$\begin{aligned}(-y)^2 &= x + 4; \\ y^2 &= x + 4.\end{aligned}$$

This is the same as the original, so the graph is **symmetric** with respect to the  $x$ -axis.

- 2 Is the graph symmetric with respect to the origin?

This time I change both  $x$  to  $-x$  and  $y$  to  $-y$ :

$$\begin{aligned}(-y)^2 &= (-x) + 4; \\ y^2 &= -x + 4.\end{aligned}$$

This is different from the original, so the graph is **not symmetric** with respect to the origin.

- 3 What are the  $y$ -intercepts of this graph, if any?

I change  $x$  to 0 and solve for  $y$ :

$$\begin{aligned}y^2 &= (0) + 4; \\ y^2 &= 4; \\ y &= \pm 2.\end{aligned}$$

Therefore, the  $y$ -intercepts are

$$(2, 0), (-2, 0).$$