1 *Consider the graph of the equation*

$$x^2 + y - 9 = 0$$

and answer the following questions about it. (Either show what equations you use to answer these questions or draw a graph in which the answers can clearly be seen.)

a *Is the graph symmetric with respect to the x-axis?*

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

$$\begin{aligned} x^2 + (-y) - 9 &= 0; \\ x^2 - y - 9 &= 0. \end{aligned}$$

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

b *Is the graph symmetric with respect to the y-axis?*

This time I change x to $-x$:

$$\begin{aligned} (-x)^2 + y - 9 &= 0; \\ x^2 + y - 9 &= 0. \end{aligned}$$

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

c *Is the graph symmetric with respect to the origin?*

This time I change both:

$$\begin{aligned} (-x)^2 + (-y) - 9 &= 0; \\ x^2 - y - 9 &= 0. \end{aligned}$$

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

d *What are the x-intercepts of this graph?*

I change y to 0 and solve for x:

$$\begin{aligned} x^2 + (0) - 9 &= 0; \\ x^2 &= 9; \\ x &= \pm 3. \end{aligned}$$

Therefore, the x-intercepts are ± 3, or

$$(3, 0),\ (-3, 0).$$

e *What are the y-intercepts of this graph?*

I change x to 0 and solve for y:

$$\begin{aligned} (0)^2 + y - 9 &= 0; \\ y &= 9. \end{aligned}$$

Therefore, the only y-intercept is 9, or

$$(0, 9).$$