

## Exercise 7

For the following exercises, rewrite the quadratic functions in standard form and give the vertex.

$$g(x) = x^2 + 2x - 3$$

### Solution

In order to write this quadratic function in vertex form, it's necessary to complete the square, which makes use of the following algebraic identity.

$$(x + B)^2 = x^2 + 2xB + B^2$$

Notice that  $2B = 2$ , which means  $B = 1$  and  $B^2 = 1$ . Add and subtract 1 on the right side and use the identity so that  $x$  appears in only one place.

$$\begin{aligned} g(x) &= x^2 + 2x - 3 \\ &= (x^2 + 2x + 1) - 3 - 1 \\ &= (x + 1)^2 - 4 \end{aligned}$$

Therefore, the vertex of the parabola is  $(-1, -4)$ .

