Exercise 10

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

$$h(x) = 2x^2 + 8x - 10$$

Solution

Begin by factoring the coefficient of x^2.

$$h(x) = 2(x^2 + 4x - 5)$$

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 $2B = 4$, which means $B = 2$ and $B^2 = 4$. Add and subtract 4 on the right side within the parentheses and use the identity so that x appears in only one place.

$$\begin{aligned} h(x) &= 2(x^2 + 4x - 5) \\ &= 2[(x^2 + 4x + 4) - 5 - 4] \\ &= 2[(x + 2)^2 - 9] \\ &= 2(x + 2)^2 - 18 \end{aligned}$$

Therefore, the vertex of the parabola is $(-2, -18)$.

$y = 2x^2 + 8x - 10$

$(-2, -18)$