Exercise 6

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

$$f(x) = x^2 - 12x + 32$$

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 $2B = -12$, which means $B = -6$ and $B^2 = 36$. Add and subtract 36 on the right side and use the identity so that x appears in only one place.

$$\begin{aligned} f(x) &= x^2 - 12x + 32 \\ &= (x^2 - 12x + 36) + 32 - 36 \\ &= (x + (-6))^2 - 4 \\ &= (x - 6)^2 - 4 \end{aligned}$$

Therefore, the vertex of the parabola is $(6, -4)$.