Let $f(x) = 2x^2 + 12x + 11$

The function can also be expressed in the form $f(x) = a(x-h)^2 + k$

a) Find the equation of the axis of symmetry

b) Write down the value of h

c) Write down the value of k

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a) The line of symmetry of the graph

$y = ax^2 + bx + c$ is $\boldsymbol{x = -\frac{b}{2a}}$

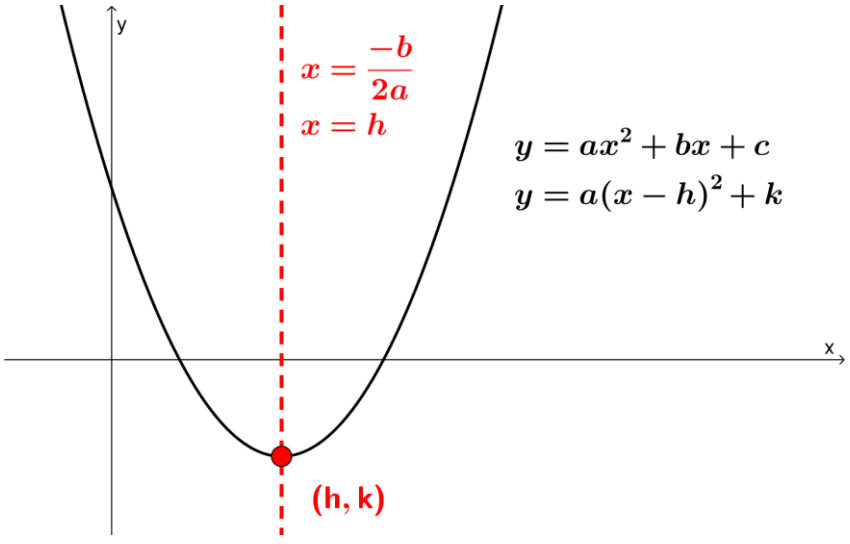
The axis of symmetry of the graph

$f(x) = 2x^2 + 12x + 11$ is $\boldsymbol{x = -\frac{12}{2 \cdot 2}}$

The axis of symmetry is $\boldsymbol{x = -3}$

b) $f(x) = 2x^2 + 12x + 11 \equiv a(x-h)^2 + k$

We know that $a = 2$



Since the axis of symmetry is $\boldsymbol{x = -3}$
and $y = a(x-h)^2 + k$ gives us the vertex (h, k)
then $\boldsymbol{h = -3}$

c) The function becomes $f(x) = 2x^2 + 12x + 11 \equiv 2(x+3)^2 + k$

$$\begin{aligned} 2(x+3)^2 &\equiv 2(x+3)(x+3) \\ &\equiv 2(x^2+6x+9) \\ &\equiv 2x^2+12x+18 \end{aligned}$$

$f(x) = 2x^2 + 12x + 11 \equiv 2(x+3)^2 + k$
$f(x) = 2x^2 + 12x + 11 \equiv 2x^2 + 12x + 18 + k$
$\boldsymbol{k = -7}$

Alternative solution

b) $f(x) = 2x^2 + 12x + 11$
$= 2(x^2+6x) + 11$
$= 2(x+3)^2 - 2 \cdot 3^2 + 11$
$= 2(x+3)^2 - 18 + 11$
$= 2(x+3)^2 - 7$
$\boldsymbol{h = -3}$

c) $\boldsymbol{k = -7}$