Formulas for the Vertex and Axis of Symmetry

The graph of $f(x) = ax^2 + bx + c$ is a parabola.

The **axis of symmetry** has equation $x = -\dfrac{b}{2a}$

The **vertex** is the point $\left(-\dfrac{b}{2a},\ f\left(-\dfrac{b}{2a} \right) \right)$

$$f(x) = a(x-h)^2 + k$$

vertex: (h, k)

axis of : $x = h$
symmetry

Example: Find the axis of symmetry and vertex of $f(x) = 3x^2 + 12x + 16$