Question

Write each equation in standard form

y^2 + 4y − 8x + 4 = 0

Solution

The standard form of the equation of the parabola is as follows:

$y = ax^2 + bx + c$

(in this case the axis of symmetry of the parabola is parallel to the y-axis).

We shall transform our equation to the form

$x = ay^2 + by + c$

(in this case the axis of symmetry will be parallel to x-axis).

Equation

$y^2 + 4y - 8x + 4 = 0$

can be rewritten as

$x = \frac{y^2}{8} + \frac{y}{2} + \frac{1}{2}$

$x = \frac{1}{8}(y^2 + 4y + 4)$

$x = \frac{1}{8}(y + 2)^2$ is the so-called vertex form.

In this case the axis of symmetry has the equation

$$y = -\frac{b}{2a},$$

i.e. $y = -\frac{1/2}{2 \cdot 1/8}, \quad y = -2.$