

Quadratic Equations, Functions, Zeros, and Models

3.2

QUADRATIC EQUATIONS

A **quadratic equation** is an equation that can be written in the form

$$ax^2 + bx + c = 0, \quad a \neq 0,$$

where a , b , and c are real numbers.

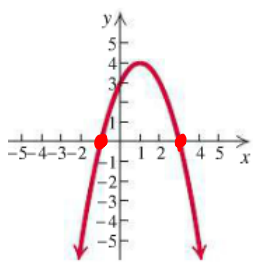
QUADRATIC FUNCTIONS

A **quadratic function** f is a function that can be written in the form

$$f(x) = ax^2 + bx + c, \quad a \neq 0,$$

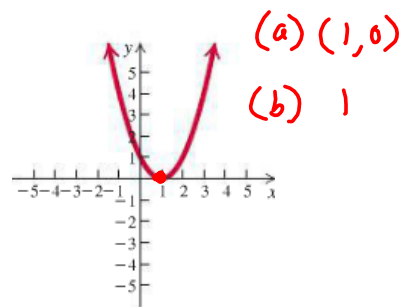
where a , b , and c are real numbers.

In Exercises 21–28, use the given graph to find (a) the x -intercepts and (b) the zeros of the function.



(a) $(-1, 0)$, $(3, 0)$

(b) $-1, 3$



(a) $(1, 0)$

(b) 1

The Principle of Zero Products: If $ab = 0$ is true, then $a = 0$ or $b = 0$, and if $a = 0$ or $b = 0$, then $ab = 0$.

$$(5x - 2)(2x + 3) = 0$$

$$5x - 2 = 0 \quad \text{or} \quad 2x + 3 = 0$$

$$5x = 2$$

$$x = \frac{2}{5}$$

x -int

$$2x = -3$$

$$x = -\frac{3}{2}$$

x -int

$$x^2 - 8x - 20 = 0$$

$$(x - 10)(x + 2) = 0$$

$$x - 10 = 0 \quad \text{or} \quad x + 2 = 0$$

$$x = 10$$

x -int

$$x = -2$$

x -int