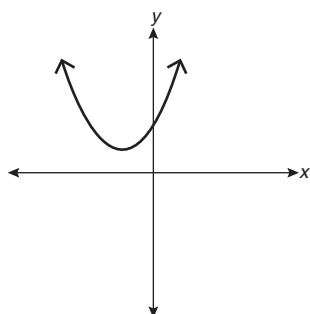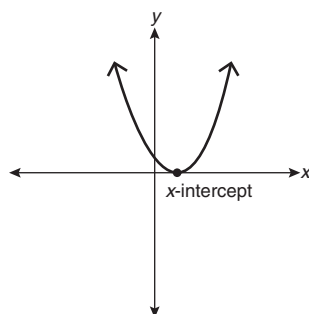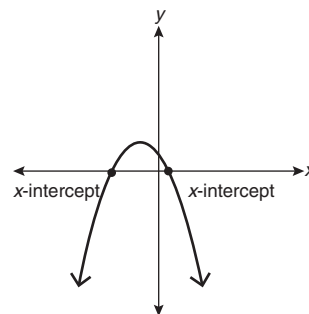Recall that a quadratic function can have 0, 1, or 2 Real Number zeros and the graph of a quadratic function can have 0, 1, or 2 x-intercepts. As such, a quadratic equation can have 0, 1, or 2 Real solutions.

no Real zeros and the corresponding equation has no Real solution

one Real zero and the corresponding equation has one Real solution
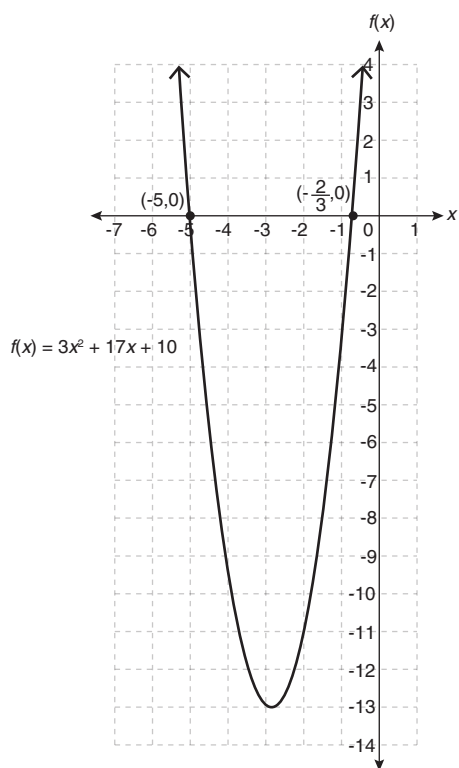
two Real zeros and the corresponding equation has two Real solutions

Practice Run

1. Use the graph provided to determine the solutions to the quadratic equation $3x^2 + 17x + 10 = 0$. Verify the solutions by substituting them into the equation.

$f(x) = 3x^2 + 17x + 10$

2. a. Determine the x-intercepts of the graph of the function
$f(x) = (x - 7)(x - 12)$.

b. Determine the solutions to the equation $(x - 7)(x - 12) = 0$.

Compare your answers.

1. Use the graph provided to determine the solutions to the quadratic equation
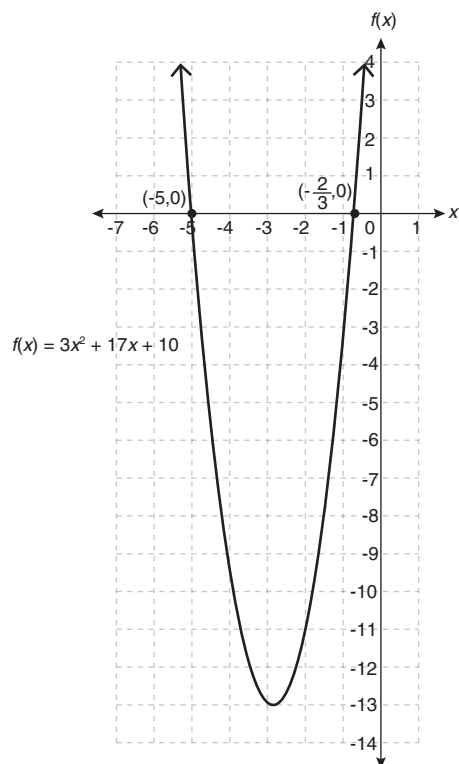$3x^2 + 17x + 10 = 0$. Verify the solutions by substituting them into the
equation.

The solutions to the equation $3x^2 + 17x + 10 = 0$ will be the x-intercepts of the graph
of the function $f(x) = 3x^2 + 17x + 10$. The x-intercepts are -5 and $-\frac{2}{3}$, so the
solutions to the corresponding quadratic equation are -5 and $-\frac{2}{3}$.

Verification:

For $x = -5$,

	Left Side	Right Side
	$3x^2 + 17x + 10$	0
	$3(-5)^2 + 17(-5) + 10$	
	$75 - 85 + 10$	
	0	

The two sides are equal, so -5 is a solution.

For $x = -\dfrac{2}{3}$,

	Left Side	Right Side
	$3x^2 + 17x + 10$	0
	$3\left(-\dfrac{2}{3}\right)^2 + 17\left(-\dfrac{2}{3}\right) + 10$	
	$\dfrac{4}{3} - \dfrac{34}{3} + 10$	
	0	

The two sides are equal, so $-\dfrac{2}{3}$ is a solution.

2. a. Determine the x-intercepts of the graph of the function
    $f(x) = (x - 7)(x - 12)$.

    The function is in factored form so the x-intercepts can be determined as follows:
    $f(x) = (x - 7)(x - 12)$
    $0 = (x - 7)(x - 12)$
    $0 = x - 7 \qquad 0 = x - 12$
    $7 = x \qquad\quad 12 = x$

    The x-intercepts are 7 and 12.

    b. Determine the solutions to the equation $(x - 7)(x - 12) = 0$.

    The solutions to the equation $(x - 7)(x - 12) = 0$ will be the x-intercepts of the graph of the function $f(x) = (x - 7)(x - 12)$. The x-intercepts are 7 and 12, so the solutions to the corresponding quadratic equation are 7 and 12.