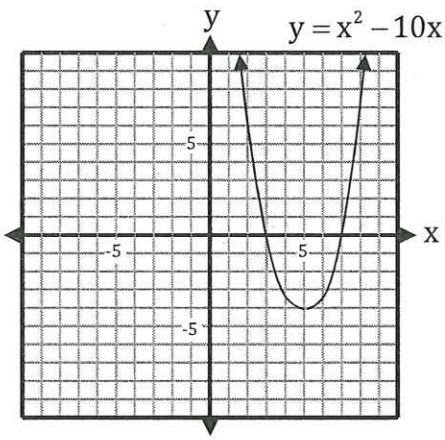
Pre-Calculus 11

Chapter 4: Quadratic Equations

A quadratic function can be written in the form $y = ax^2 + bx + c \ (a \neq 0)$.

A quadratic equation can be written in the form $ax^2 + bx + c = 0 \ (a \neq 0)$.

The x-intercepts/zeros of a quadratic function are the solutions/roots of the corresponding equation.

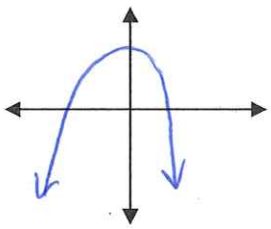


eg. The x-intercepts /zeros of the function $y = x^2 - 10x + 21$ are 3 and 7.

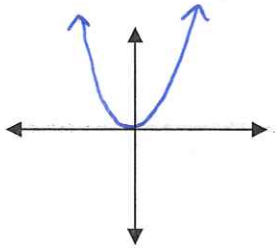
The solutions/roots of the equation $x^2 - 10x + 21 = 0$ are 3 and 7.

A quadratic function can have:

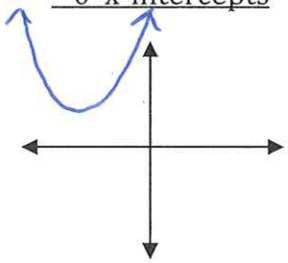
2 x-intercepts



1 x-intercept



0 x-intercepts



Therefore a quadratic equation can have 2, 1, or 0 real roots.

We can solve a quadratic equation by

- graphing
- factoring
- completing the square
- using the quadratic formula

Preview: Mixed and Entire Radicals

Multiplication Property of Radicals: $\sqrt[n]{ab} = \sqrt[n]{a} \cdot \sqrt[n]{b}$

Example: Simplify each radical.

a) $\sqrt{63}$

$= \sqrt{9 \cdot 7}$ or $\sqrt{3 \cdot 3 \cdot 7}$

$= \sqrt{9} \cdot \sqrt{7}$ $3\sqrt{7}$

$= 3\sqrt{7}$

b) $\sqrt{80}$

$= \sqrt{8 \cdot 10}$

$= \sqrt{2 \cdot 4 \cdot 2 \cdot 5}$

$= \sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 5}$

$= 2 \cdot 2\sqrt{5} = 4\sqrt{5}$

Example: Write each mixed radical as an entire radical.

a) $5\sqrt{3}$

$= \sqrt{3 \cdot 5 \cdot 5}$

$= \sqrt{75}$

b) $6\sqrt{2}$

$= \sqrt{6 \cdot 6 \cdot 2}$

$= \sqrt{72}$