

1.3 Quadratic Equations

Definition

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

$$ax^2 + bx + c = 0$$

where a, b , and c are real numbers and $a \neq 0$.

1.3.1 Solving Quadratics by Factoring

The Zero Product Theorem

If $A \cdot B = 0$, then $A = 0$ or $B = 0$

Example: Solve by factoring

Solve each quadratic equation by factoring

a. $x^2 + 2x - 15 = 0$

b. $2x^2 - 5x = 12$

Problem:

Solve by factoring: $12x^2 - 41x + 24 = 0$

1.3.2 Solving Quadratic Equations by taking Square Roots

Note, $\sqrt{x^2} = |x|$, and we know how to solve equations of the form $|x| = k$

Example:

Solve $x^2 = 25$

Example: Solving by taking square roots

Solve by taking square roots:

a. $2(y - 3)^2 - 10 = 0$

b. $(x + 3)^2 + 8 = 0$

Problem

Solve by taking square roots: $(z - 6)^2 - 4 = 14$