Quadratic Formula

Objectives

The Quadratic Formula

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

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Example 1

Solve each of the following using the quadratic formula. Exact answers only.

(a) $3x^2 + 8x - 28 = 0$

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$$x = 2$$

$$x = -\frac{14}{3}$$

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$$x = \frac{6 \pm \sqrt{6^2 - 4(6)(-5)}}{2(6)}$$

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$$10x^2 + 10x - 7$$

$$a = 10 \quad b = 10 \quad c = -7$$

$$x = \frac{-10 \pm \sqrt{10^2 - 4(10)(-7)}}{2(10)}$$

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The expression $b^2 - 4ac$ in the square root is called the discriminant. It can tell us about the solutions to a quadratic equation:

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The expression $b^2 - 4ac$ in the square root is called the discriminant. It can tell us about the solutions to a quadratic equation:

- **Discriminant is negative:** No real values of x make the original equation true.
- **Discriminant is 0:** There is one value of x (called a *double root*).
- **Discriminant is positive:** There are 2 unique answers for x.

The Discriminant

In addition, if $\sqrt{b^2 - 4ac}$ equals a rational number, then the quadratic equation is factorable over the integers (only use integers in your factoring).