

Lesson 13: Solving Quadratic Equations by Completing the Square

Classwork

Opening Exercise

- a. Solve the equation for b : $2b^2 - 9b = 3b^2 - 4b - 14$.
- b. Rewrite the expression by completing the square: $\frac{1}{2}b^2 - 4b + 13$.

Example 1

Solve for x .

$$12 = x^2 + 6x$$

Rational and Irrational Numbers

The *sum or product of two rational numbers* is always a *rational number*.

The *sum of a rational number and an irrational number* is always an *irrational number*.

The *product of a rational number and an irrational number* is an *irrational number* as long as the rational number is not zero.

Example 2

Solve for x .

$$4x^2 - 40x + 94 = 0$$

Exercises

Solve each equation by completing the square.

1. $x^2 - 2x = 12$

2. $\frac{1}{2}r^2 - 6r = 2$

3. $2p^2 + 8p = 7$

4. $2y^2 + 3y - 5 = 4$

Lesson Summary

When a quadratic equation is not conducive to factoring, we can solve by completing the square.

Completing the square can be used to find solutions that are irrational, something very difficult to do by factoring.

Problem Set

Solve each equation by completing the square.

1. $p^2 - 3p = 8$

2. $2q^2 + 8q = 3$

3. $\frac{1}{3}m^2 + 2m + 8 = 5$

4. $-4x^2 = 24x + 11$