6.5 Solving Equations by Factoring

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Objectives

- Learn and use the zero-factor property.
- Solve applied problems that require the zero-factor property.
- Solve a formula for a specified variable, where factoring is necessary.

Quadratic Equation

- An equation that can be written in the form

where *a*, *b*, and *c* are real numbers, with $a \neq 0$, is a

Zero-Factor Property

- If two numbers have a product of 0, then at least one of the numbers must be 0.

Solve

- $(x + 6)(2x - 3) = 0$

Solve

- $x(4x - 1) = 0$

Solving a Quadratic Equation by Factoring

- _____. Rewrite the equation if necessary so that one side is 0.
- _____ the polynomial.
- _____. Set each variable factor equal to 0.
- _____. Solve each equation formed in Step 3.
- _____ each solution in the *original* equation.

Solve

- $3x^2 - x = 4$

Solve

- $16m^2 + 24\mathrm{m} + 9 = 0$

Solve

- $x^2 + 12x = 0$

Solve

- $5x^2 - 80 = 0$

Solve

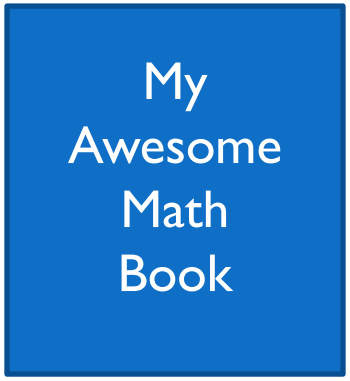
- $(x + 6)(x - 2) = 2 + x - 10$

Solve

- $-x^3 + x^2 = -6x$

Applied Problems

- The length of a book is 2 in less than three times the width. The area of the book is 96 in^2. Find the width of the book.

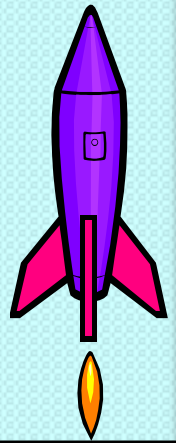


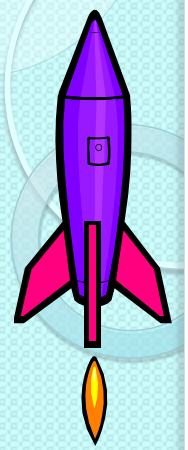
Applied Problems

- Quadratic functions are used to describe the height a falling object or a projected object reaches in a specific time. For example, if a small rocket is launched vertically upward from ground level with an initial velocity of 128 ft per sec, then its height in feet after t seconds is defined by

$$h(t) = -16t^2 + 128t$$

if air resistance is neglected.





$$h(t) = -16t^2 + 128t$$

After how many seconds will the rocket be 220 ft above ground?

Solve for a Specified Variable

- Solve the formula for H.

$$A = 2HW + 2LW + 2LH$$

Solve for a Specified Variable

- Solve the formula for p.

$$4s + 7p = tp - 7$$

Solve for a Specified Variable

- Solve the formula for t.

$$c = -\frac{2t + 4}{t}$$