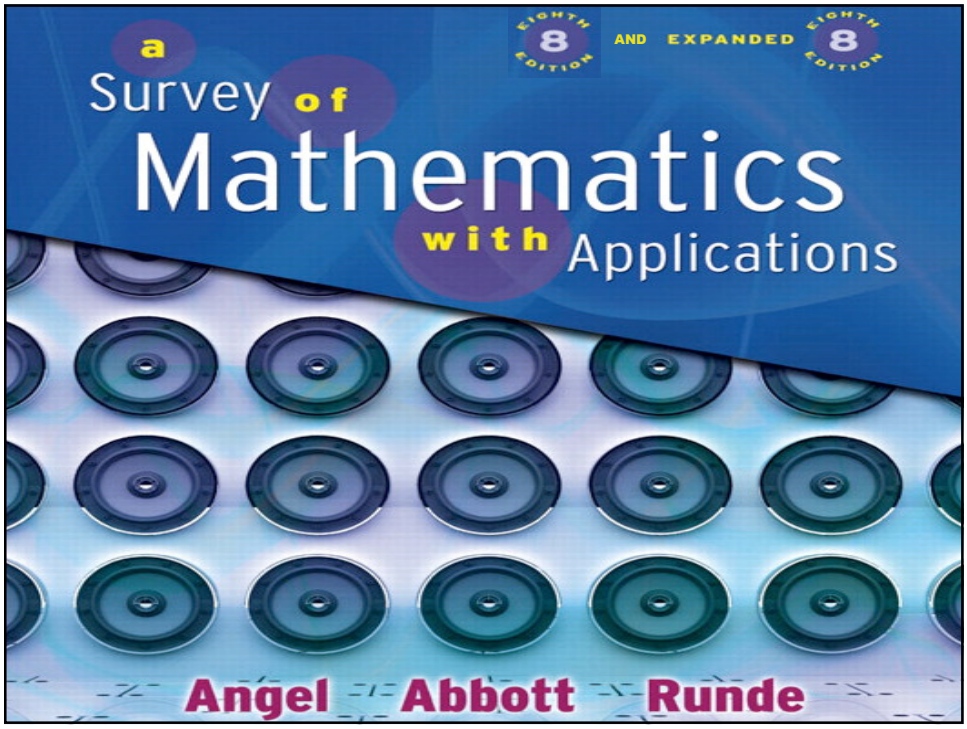


Chapter 6

Algebra, Graphs and Functions

Section 3

Formulas

Definitions

- A **formula** is an equation that typically has a real-life application.
- To **evaluate a formula**, substitute the given values for their respective variables and then evaluate using the order of operations.

Perimeter

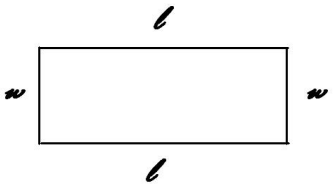
- The formula for the perimeter of a rectangle is *Perimeter* = 2 • *length* + 2 • *width* or $P = 2l + 2w$.
- Use the formula to find the perimeter of a yard when $l = 150$ feet and $w = 100$ feet.

$P = 2l + 2w$

$P = 2(150) + 2(100)$

$P = 300 + 200$

$P = 500$ feet



Example

- The formula for the volume of a cylinder is $V = \pi r^2 h$ where π is an irrational number equal to approximately 3.14. Use the formula to find the height of a cylinder with a radius of 6 inches and a volume of 565.49 in^3.

$$V = p\, r^2 h$$

$$565.49 = p\,(6^2)h$$

$$565.49 = 36p\, h$$

$$\frac{565.49}{36p} = \frac{36p\, h}{36p}$$

$$5.000 \approx h$$

The height of the cylinder is approximately 5 inches.

Exponential Equations: Carbon Dating

- Carbon dating is used by scientists to find the age of fossils, bones, and other items. The formula used in carbon dating is $P = P_0 2^{-t/5600}$ where P_0 = original amount of carbon 14 (C_{14}) present and P = amount of C_{14} present after t years.
- If 15 mg of C_{14} is present in an animal bone recently excavated, how many milligrams will be present in 4000 years?

Exponential Equations: Carbon Dating (continued)

- $P = P_0 2^{-t/5600}$

  $P = 15(2)^{-4000/5600}$

  $P \approx 15(2)^{-.71}$

  $P \approx 15(0.61)$

  $P \approx 9.2 \text{ mg}$

- In 4000 years, approximately 9.2 mg of the original 15 mg of C_{14} will remain.

Solving for a Variable in a Formula or Equation

- Solve the equation $3x + 8y - 9 = 0$ for y.

$$3x + 8y - 9 = 0$$
$$3x + 8y - 9 + 9 = 0 + 9$$
$$3x + 8y = 9$$
$$3x - 3x + 8y = 9 - 3x$$
$$8y = 9 - 3x$$
$$\frac{8y}{8} = \frac{9 - 3x}{8}$$
$$y = \frac{9 - 3x}{8}$$

Solving for a Variable in a Formula or Equation (continued)

Solve $A = \frac{h}{2}(b_1 + b_2)$ for b_2.

$$A = \frac{h}{2}(b_1 + b_2)$$
$$2 \cdot (A) = 2 \cdot \left(\frac{h}{2}(b_1 + b_2)\right)$$
$$2A = h(b_1 + b_2)$$
$$\frac{2A}{h} = \frac{h(b_1 + b_2)}{h}$$
$$\frac{2A}{h} = b_1 + b_2$$
$$\frac{2A}{h} - b_1 = b_2$$