

**PROBLEM SOLVING**

*In Exercises 65 and 66, use the water rate for Newton, New Jersey, which is \$7.75 per 1000 gallons of water.*

65. *Water Bill* What is the water bill if a resident of Newton uses 27,000 gal?

66. *Limiting the Cost* How many gallons of water can a customer use if the water bill is not to exceed \$200?

$$\frac{7.75}{1000} = \frac{200}{x}$$

67. *Concrete Sealer* A gallon of concrete sealer covers  $360 \text{ ft}^2$ . How much sealer is needed to cover a basement with a surface area of  $1440 \text{ ft}^2$ ?

68. *Fajitas* A recipe for six servings of beef fajitas requires 16 oz of beef sirloin.

a) If the recipe were to be made for nine servings, how many ounces of beef sirloin would be needed?

b) How many servings of beef fajitas can be made with 32 oz of beef sirloin?

$$\frac{6}{16} = \frac{9}{x}$$
$$6x = 144$$
$$x = 24 \text{ oz}$$

$$\frac{3}{8} = \frac{x}{32}$$
$$\frac{96}{8} = \frac{8x}{8}$$
$$12 = x$$

69. **Watching Television** Nielson Media Research determines the number of people who watch a television show. One rating point means that about 1,102,000 households watched the show. The top-rated television show for the week of October 16, 2006, was *Grey's Anatomy* with a rating of 14.4. About how many households watched *Grey's Anatomy* that week?

$$\frac{1}{1,102,000} = \frac{14.4}{x}$$

$$x = 1568$$

70. **Topsoil** A 40-pound bag of topsoil will cover a surface area of 12 ft<sup>2</sup>.

- a) How many pounds of topsoil are needed to cover a surface area of 480 ft<sup>2</sup>?
- b) How many bags of topsoil must be purchased to cover a surface area of 480 ft<sup>2</sup>?

$$\frac{40}{12} = \frac{x}{480}$$

$$12x = \frac{19200}{12}$$

$$x = 1600$$

$$\frac{1600}{40} = 40 \text{ bags}$$

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A doctor asks a nurse to give a patient 250 mg of the drug Simethicone. The nurse says to the doctor, "What the hell is Simethicone? and you know we don't have that concentration of the solution for 250 mg!!!! Why can't you make it easy on me and give the darn patient the dosage we have in stock?!!!!"

The drug is available only in a solution whose concentration is 40 mg Simethicone per 0.6 millimeters of solution. How many millimeters of solution should the nurse give the patient?

$$\frac{40 \text{ mg}}{.6 \text{ mm}} = \frac{250}{x}$$

$$\frac{40}{250} = \frac{.6}{x}$$

$$x = 3.75$$

## Proportions

1. A basketball player scores 162 points in 9 games. At this rate how many points will he score in 20 games?

$$\frac{162}{9} = \frac{x}{20}$$

$$9x = 360$$

$$x = 360$$

2. James read 4 pages in a book in 6 minutes. How long would you expect him to take read 6 pages?

$$\frac{4}{6} = \frac{6}{x}$$

$$4x = 36 \quad x = 9$$

3. Sara can type 90 words in 4 minutes. About how many words would you expect her to type in 2 hours?

$$\frac{90 \text{ words}}{4 \text{ min}} = \frac{x}{120 \text{ min}}$$

$$x = 2700$$

4. Jeannie takes inventory of her closet and discovers that she has 8 shirts for every 5 pair of jeans. If she has 40 shirts, how many pairs of jeans does she have?

$$\frac{8}{5} = \frac{40}{x}$$

$$8x = 200$$

$$x = 25$$

5. Sam works as a dental hygienist. Last week Sam made \$500 for 20 hours of work. How many hours must Sam work in order to make \$700?

$$\frac{500}{20} = \frac{700}{x}$$

$$500x = 14000$$

$$x = 28$$