Objective #3: Solve problems involving proportions.

✔ Solved Problem #3

✎ Pencil Problem #3✐

3a. The property tax on a house with an assessed value of $250,000 is $3500. Determine the property tax on a house with an assessed value of $420,000, assuming the same tax rate.

Let x = the property tax on the $420,000 house.

$$\frac{\text{Tax on \$250,000 house}}{\text{Assessed value (\$250,000)}} = \frac{\text{Tax on \$420,000 house}}{\text{Assessed value (\$420,000)}}$$

$$\frac{\$3500}{\$250,000} = \frac{\$x}{\$420,000}$$

$$\frac{3500}{250,000} = \frac{x}{420,000}$$

$$250,000x = (3500)(420,000)$$

$$250,000x = 1,470,000,000$$

$$\frac{250,000x}{250,000} = \frac{1,470,000,000}{250,000}$$

$$x = 5880$$

The property tax is $5880.

3a. The tax on a property with an assessed value of $65,000 is $720. Find the tax on a property with an assessed value of $162,500.

3b. Wildlife biologists catch, tag, and then release 120 deer back into a wildlife refuge. Two weeks later they observe a sample of 150 deer, 25 of which are tagged. Assuming the ratio of tagged deer in the sample holds for all deer in the refuge, approximately how many deer are in the refuge?

Let x = the total number of deer in the refuge.

$$\frac{120}{x} = \frac{25}{150}$$

$$25x = (120)(150)$$

$$25x = 18,000$$

$$\frac{25x}{25} = \frac{18,000}{25}$$

$$x = 720$$

There are about 720 deer in the refuge.

3b. St. Paul Island in Alaska has 12 fur seal rookeries (breeding places). In 1961, to estimate the fur seal pup population in the Gorbath rookery, 4963 fur seal pups were tagged in early August. In late August, a sample of 900 pups was observed and 218 of these were found to have been previously tagged. Estimate the total number of fur seal pups in this rookery.

Objective #4: Solve problems involving similar triangles.

✔ **Solved Problem #4**

4. The similar triangles in the figure are shown with corresponding sides in the same relative position.

3 in.
12 in.

8 in.
x
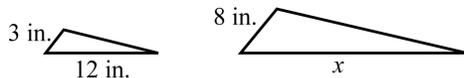
Find the missing length, x.
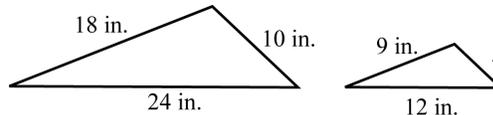
$$\frac{3}{8} = \frac{12}{x}$$

$3x = 8 \cdot 12$

$3x = 96$

$x = 32$

The missing length is 32 inches.

✎ **Pencil Problem #4**✎

4. The similar triangles in the figure are shown with corresponding sides in the same relative position.

18 in.
10 in.
24 in.

9 in.
x
12 in.

Find the missing length, x.

Answers for Pencil Problems *(Textbook Exercise references in parentheses)*:

1. The jogger runs 10 miles per hour downhill and 6 miles per hour uphill. *(7.7 #3)*

2. 10 miles per hour. *(7.7 #9)*

3a. $1800 *(7.7 #17)*

3b. about 20,489 fur seal pups *(7.7 #19)*

4. 5 inches *(7.7 #25)*

Homework:

☐ **Review the Section 7.7 summary** which begins on page 559 of the textbook.

☐ **Insert your homework** into this section of the *Learning Guide*. Show all work neatly and check your answers. Strive to work through difficulties when possible, making note of any exercises where you need additional help. Remember, even if your instructor assigns homework through *MyMathLab*, you should still write out your work.