Areas of Similar Figures

1. The ratio of the areas of two squares is $\frac{16}{25}$.

   a. What is the ratio of their sides?

   b. The larger square has sides of length 10 centimeters. What is the side length of the smaller square? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.

2. Two rooms are similar in shape, with corresponding lengths in the ratio of $\frac{2}{3}$. It takes 3 gallons of paint to cover the walls of the larger room. How much paint will be needed to paint the smaller room? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.

3. The ratio of the areas of two circles is $\frac{9}{16}$.

   a. What is the ratio of their radii?

   b. The smaller circle has a radius of 6 centimeters. What is the radius of the larger circle? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.

4. A rectangular yard has an area of 180 m^2. A similar yard has an area of 20 m^2. If the length of the larger yard is 20 m, what is the length of the smaller yard? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.

5. Jose bought carpeting for his living room and for his dining room. His living room is similar to his dining room and 1.5 times as long. If it costs $1000 for the carpet for the dining room, how much should it have cost to buy the carpet for the living room? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.

Answers:

1. a. 4:5 b. $\frac{4}{5}=\frac{x}{10}$, x = 8 centimeters

2. Ratio of lengths is $\frac{2}{3}$ so the ratio of the areas is $\frac{4}{9}$

   $\frac{4}{9}=\frac{x}{3}$, so x = $1\frac{1}{3}$ gallons

3. a. 3:4 b. $\frac{3}{4}=\frac{6}{x}$, x = 8 centimeters

4. Ratio of areas = $\frac{180}{20}=\frac{9}{1}$ so the ratio of the lengths is 3:1.

   $\frac{3}{1}=\frac{20}{x}$ so x is approximately 6.66 meters

5. $\left(\frac{1.5}{1}\right)^2=\left(\frac{2.25}{1}\right)$ is the ratio of the areas

   $\frac{2.25}{1}=\frac{x}{1000}$, so the cost, x, is \$2250.