

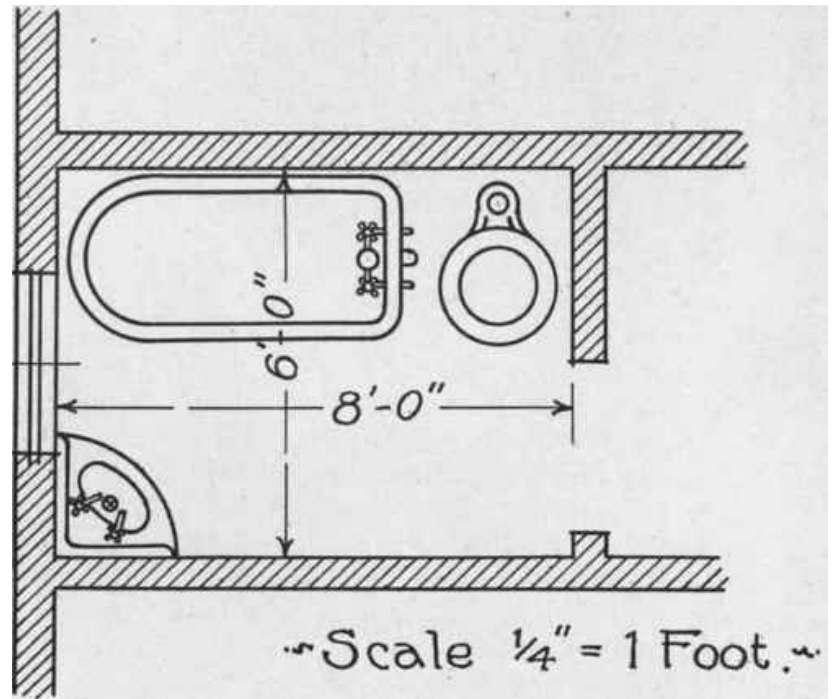
# Ratios, Proportions and Similar Figures

Ratios, proportions and scale drawings

There are many uses of ratios and proportions. We use them in map reading, making scale drawings and models, solving problems and even cooking.



The most recognizable use of ratios and proportions is drawing models and plans for construction. Scales must be used to approximate what the actual object will be like.

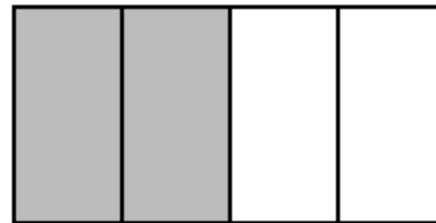


A ratio is a comparison of two quantities by division. In the rectangles below, the ratio of shaded area to unshaded area is 1:2, 2:4, 3:6, and 4:8.

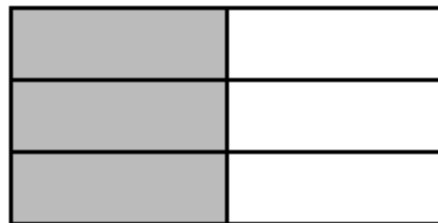
All the rectangles have equivalent shaded areas. Ratios that make the same comparison are equivalent ratios.



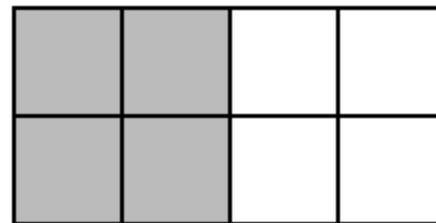
$\frac{1}{2}$



$\frac{2}{4}$



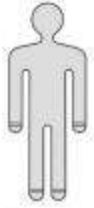
$\frac{3}{6}$



$\frac{4}{8}$

DO NOW (not later):

- Compare the number of boys to girls in the class.



- The number of boys =
- The number of girls =
- If we compare boys **to** girls we get  
\_\_\_\_ boys to \_\_\_\_\_ girls.

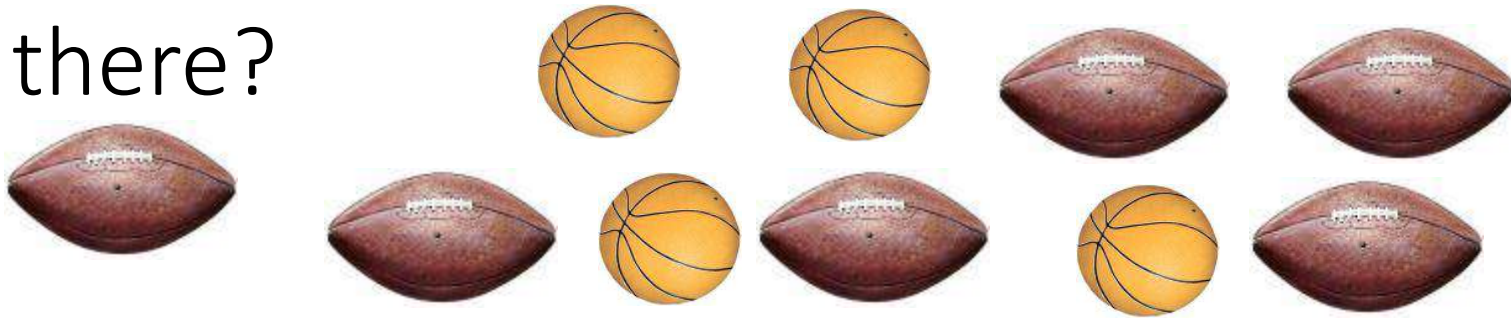
# It's Friday night and your friends are having a party.....

The ratio of girls to guys is 2 to 12.

## Would you want to attend the party?



How many basketballs to footballs are there?



- For every 4 basketballs there are 6 footballs.
- The *ratio* is 4 to 6.



# What are some other ways we can write the ratio of basketball to footballs?

Every ratio can be written in 3 ways:



- 4 to 6

First quantity **to** Second quantity

- 4 : 6

First quantity **:** Second quantity

- $\frac{4}{6}$

First quantity **divided** by the second quantity (as a **fraction**).

**Careful!!**

**Order matters in a ratio.**

**4 to 6**

**Is NOT the same as**

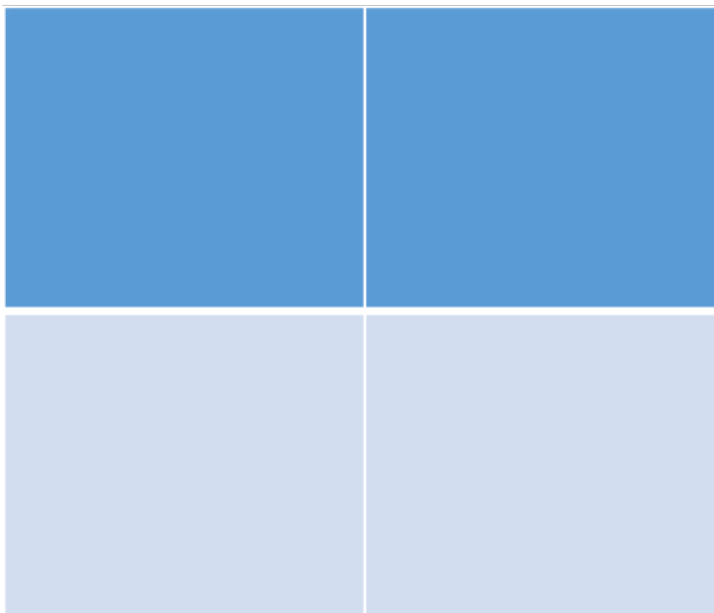
**6 to 4**



## Using ratios

The ratio of faculty members to students in one school is 1:15. There are 675 students. How many faculty members are there?

$$\frac{\text{faculty}}{\text{students}} = \frac{1}{15} \rightarrow \frac{\quad}{675}$$



# Proportions

Two ratios that are equal

A proportion is an equation that states that two ratios are equal, such as:

THINK Towanda “T”

$$\frac{2}{3} = \frac{x}{9}$$

In simple proportions, you can use this same approach when solving for a missing part of a proportion. Remember that both fractions must reduce to the same value.

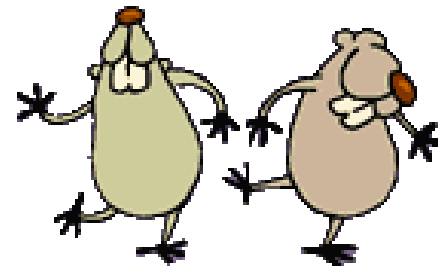
$$\frac{2}{3} = \frac{x}{9}$$

To determine the unknown value you must cross multiply.  
(Towanda "T")

1) Are the following true proportions?

$$\frac{2}{3} = \frac{10}{5}$$

$$\frac{2}{3} = \frac{10}{15}$$



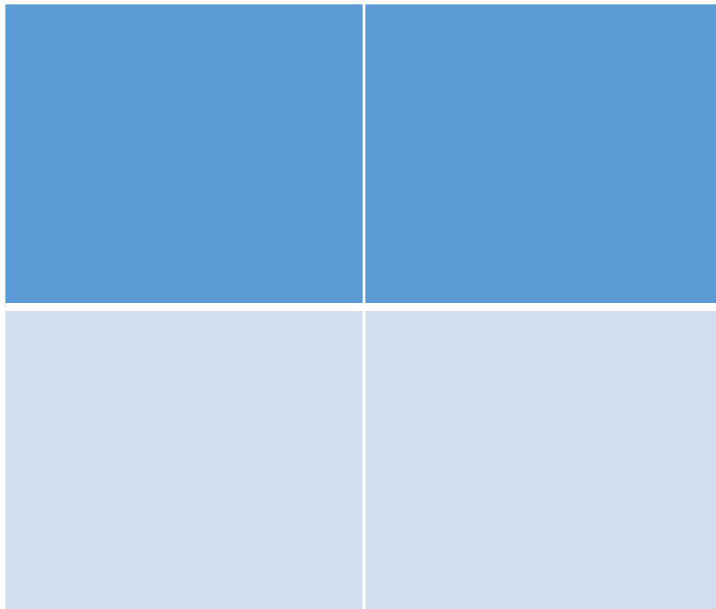
2) Solve for x: The missing number can appear any place in a proportion

$$\frac{4}{6} = \frac{x}{42}$$

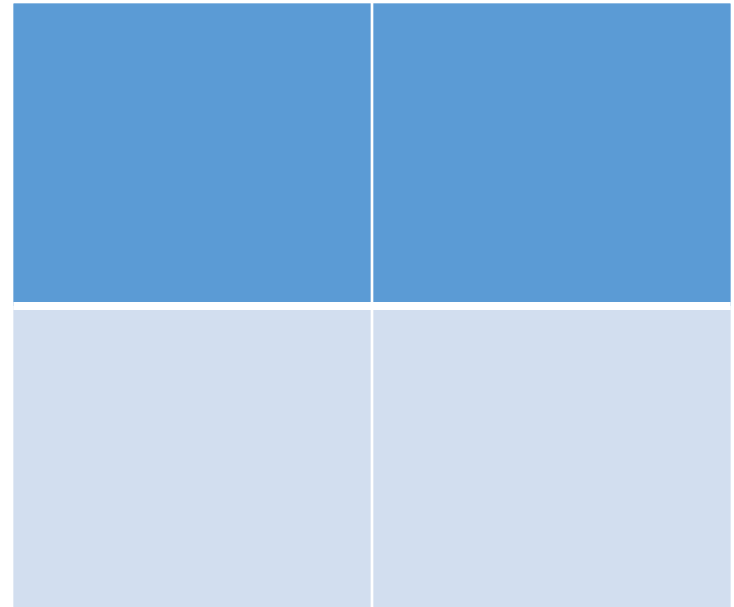
$$\frac{4}{5} = \frac{16}{x}$$

Solve the following problems.

4) If 4 tickets to a show cost \$9.00, find the cost of 14 tickets.



5) A house which is appraised for \$10,000 pays \$300 in taxes. What should the tax be on a house appraised at \$15,000.

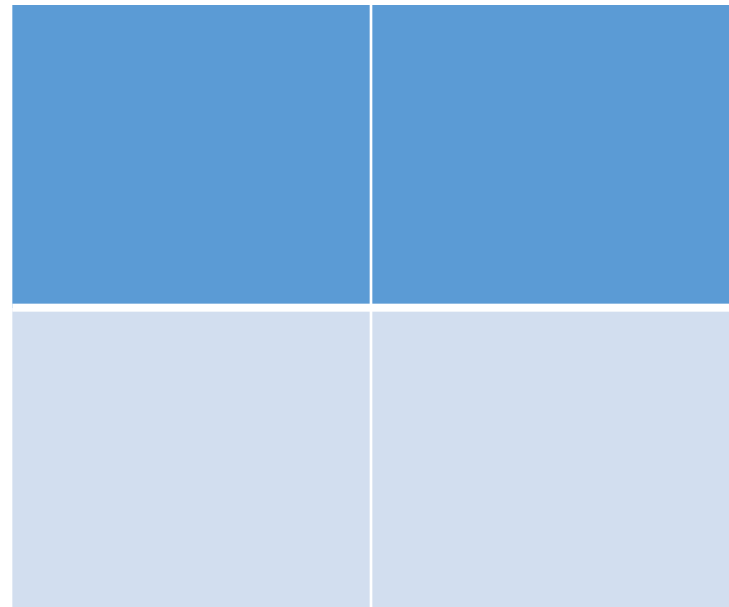
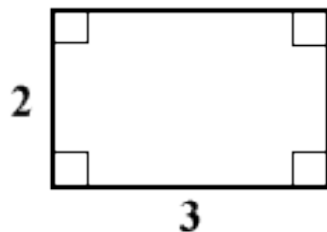
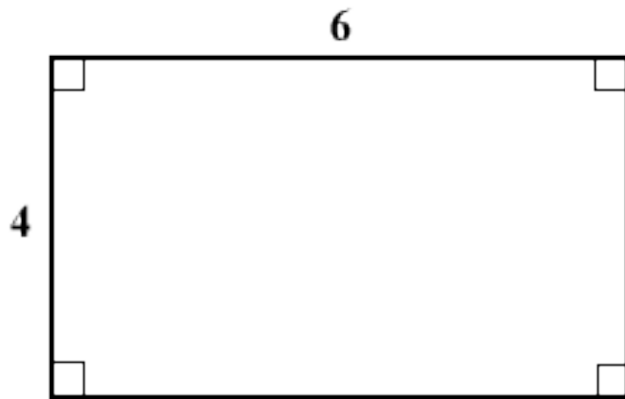




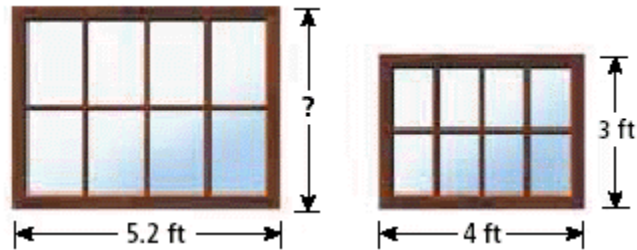
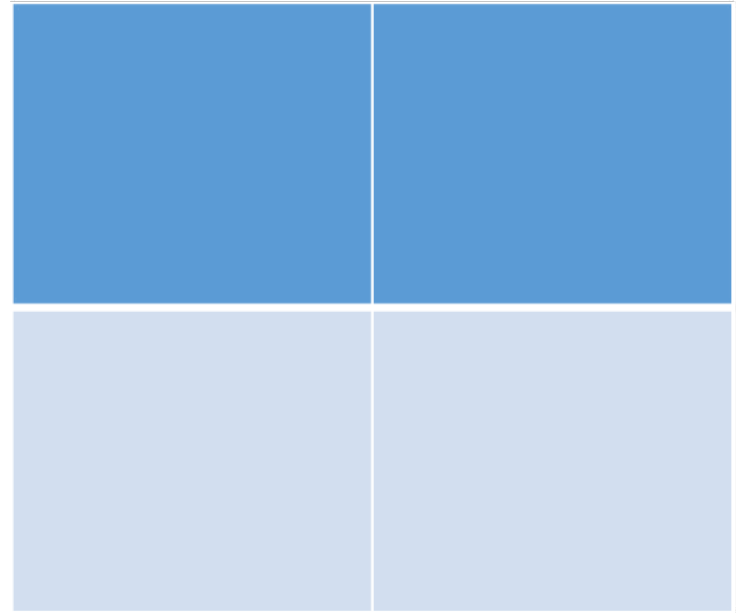
# Similar Figures

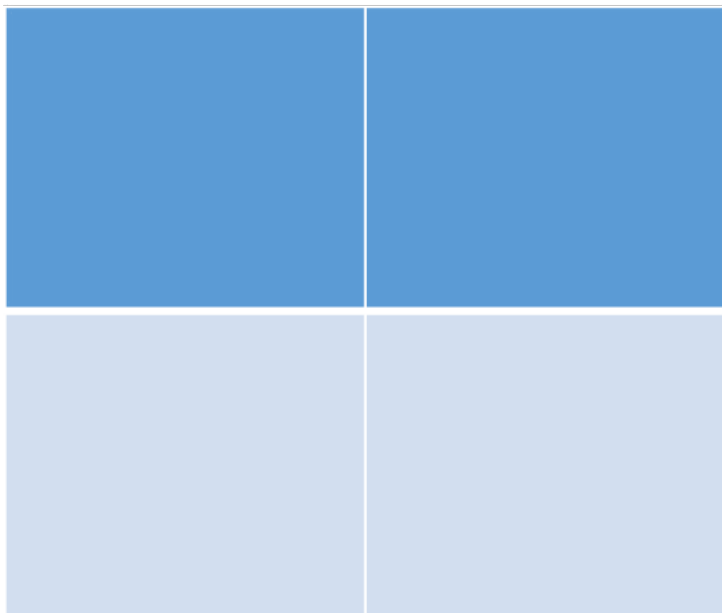
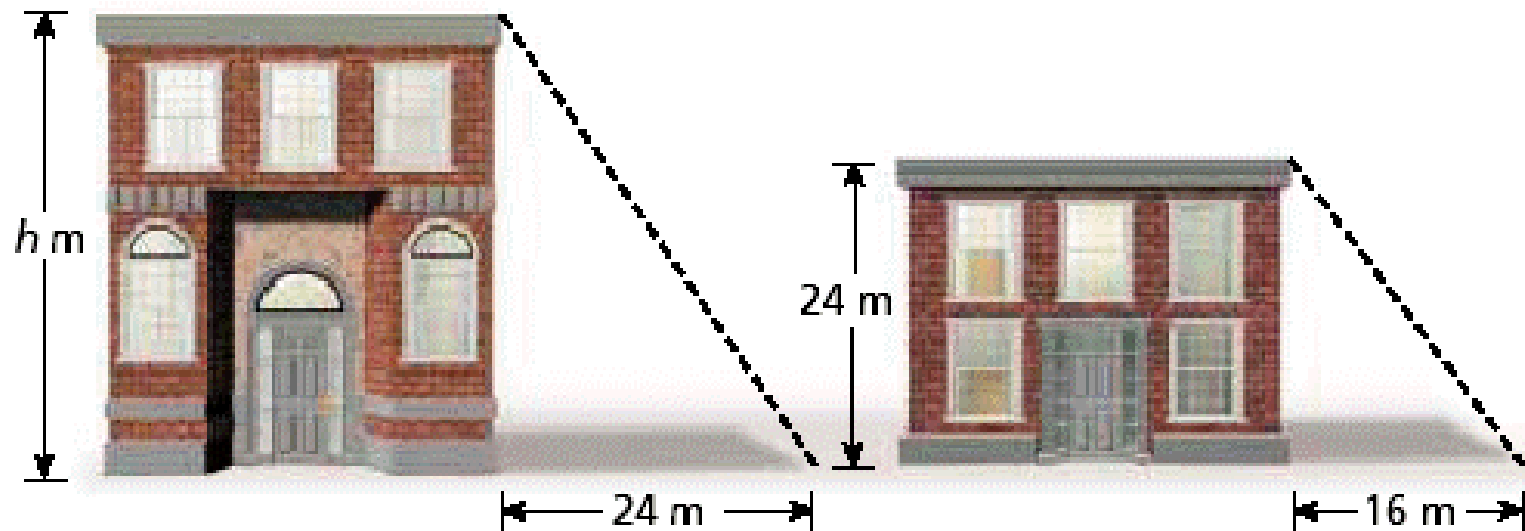
The Big and Small of it

***Congruent*** figures have the same size and shape.  
***Similar*** figures have the same shape but not necessarily the same size. The two figures below are similar. They have the same shape but not the same size.



The two windows below are similar. Find the unknown width of the larger window.





These two buildings are similar.  
Find the height of the large  
building.