Learning Target(s): I am able to state and use properties of proportions.
I am able to determine scale and use it to solve problems.

Notes: 6.2 Use Proportions to Solve Geometry Problems

ADDITIONAL PROPERTIES OF PROPORTIONS

- **Reciprocal Property:** If two ratios are equal, then their reciprocals are also equal.

  if $\frac{a}{b} = \frac{c}{d}$, then $\frac{b}{a} = \frac{d}{c}$

- If you interchange the means of a proportion, then you form another true proportion.

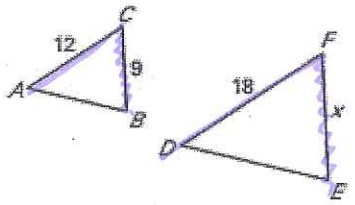
  if $\frac{a}{b} = \frac{c}{d}$, then $\frac{a}{c} = \frac{b}{d}$

- In a proportion, if you add the value of each ratio's denominator to its numerator, then you form another true proportion.

  if $\frac{a}{b} = \frac{c}{d}$, then $\frac{a+b}{b} = \frac{c+d}{d}$

Ex. 1

In the diagram, $\frac{AC}{DF} = \frac{BC}{EF}$. Write four true proportions.



① $\frac{12}{18} = \frac{9}{x}$

② $\frac{12}{9} = \frac{18}{x}$

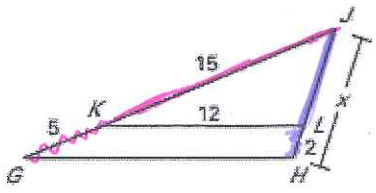
③ $\frac{12+18}{18} = \frac{9+x}{x}$

④ $\frac{18}{x} = \frac{12}{9}$

Ex. 2

In the diagram, $\frac{JL}{LH} = \frac{JK}{KG}$. Find JH and JL.

$\frac{x-2}{2} = \frac{15}{5}$

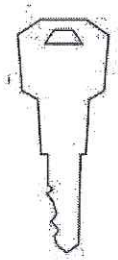


scale: a ratio that describes how the dimensions in the drawing are related to the actual dimensions of the object

scale drawing: a drawing that is the same shape as the object it represents

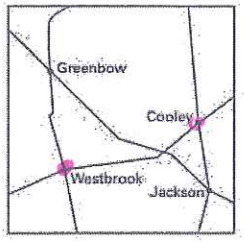
Ex. 3
The length of the key in the scale drawing is 7 cm.
The length of the actual key is 4 cm. What is the scale of the drawing?

$\frac{\text{drawing}}{\text{key}} = \frac{7\text{cm}}{4\text{cm}}$



Ex. 4
The scale of the map is 1 inch: 8 miles.
Find the actual distance from Westbrook to Cooley.

$\frac{0.75\text{ in}}{1\text{ in}} = \frac{x}{8\text{ mi}}$ $x = 6\text{ mi}$

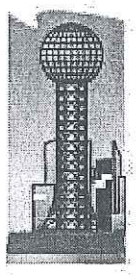


Ex. 5
You buy a 3-D scale model of the Sunsphere in Knoxville, TN.
The actual building is 266 feet tall. You model is 20 inches tall, and the diameter of the dome on your scale model is about 5.6 inches.

a. What is the diameter of the actual dome?

actual $\frac{266\text{ ft}}{x\text{ ft}} = \frac{20\text{ in}}{5.6\text{ in}}$ model 74.5 ft

weights $\frac{266}{20} = \frac{x}{5.6}$ diameters



b. How many times as tall as your model is the actual building?

$\frac{266\text{ ft}}{20\text{ in}}$ $\frac{266\text{ ft}}{1.7\text{ ft}}$ $20\text{ in} \cdot \frac{1\text{ ft}}{12\text{ in}} \approx 1.7\text{ ft}$

156.5 times as big