

## Bellwork

### 12/01/2011

A scale on a map is 1 in:24 mi. The actual distance from Wabash to Winamac is 78 miles.

1. Find the distance between Wabash and Winamac on the map?

$$\frac{1 \text{ in}}{24 \text{ mi}} = \frac{x \text{ in}}{78 \text{ mi}} \qquad 24x = 78$$
$$x = 3.25 \text{ in}$$

2. The distance on the map from Wabash to another city is 4.75 inches. How much is the actual distance between the two cities?

$$\frac{1 \text{ in}}{24 \text{ mi}} = \frac{4.75 \text{ in}}{x \text{ mi}} \qquad x = 114 \text{ mi}$$

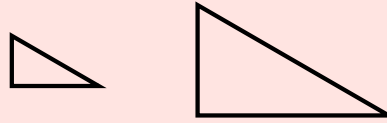
## Geometry

### 6.3 Use Similar Polygons

Standard(s): 2,9

#### Vocabulary:

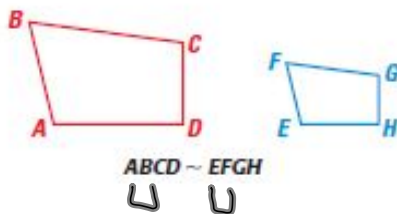
1. **Similar Polygons:** Two polygons with congruent corresponding angles and proportional corresponding side lengths.



2. **Scale Factor:** the ratio of the lengths of the corresponding sides of two similar polygons.

Two polygons are similar polygons if corresponding angles are congruent and corresponding side lengths are proportional.

In the diagram below,  $ABCD$  is similar to  $EFGH$ . You can write "ABCD is similar to EFGH" as  $ABCD \sim EFGH$ . Notice in the similarity statement that the corresponding vertices are listed in the same order.



Corresponding angles

$$\angle A \cong \angle E, \angle B \cong \angle F, \angle C \cong \angle G, \text{ and } \angle D \cong \angle H$$

Ratios of corresponding sides

$$\frac{AB}{EF} = \frac{BC}{FG} = \frac{CD}{GH} = \frac{DA}{HE}$$

#### KEY CONCEPT

*For Your Notebook*

#### Corresponding Lengths in Similar Polygons

If two polygons are similar, then the ratio of any two corresponding lengths in the polygons is equal to the scale factor of the similar polygons.

#### THEOREM

*For Your Notebook*

#### THEOREM 6.1 Perimeters of Similar Polygons

If two polygons are similar, then the ratio of their perimeters is equal to the ratios of their corresponding side lengths.

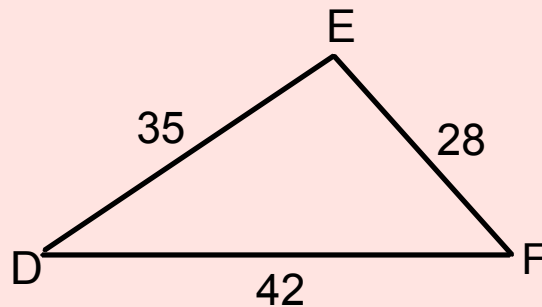
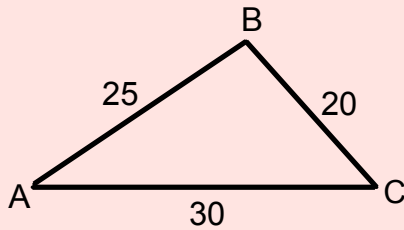


$$\text{If } KLMN \sim PQRS, \text{ then } \frac{KL + LM + MN + NK}{PQ + QR + RS + SP} = \frac{KL}{PQ} = \frac{LM}{QR} = \frac{MN}{RS} = \frac{NK}{SP}.$$

*Proof:* Ex. 38, p. 379

## Use Similarity Statements

In the diagram,  $\triangle ABC \sim \triangle DEF$ .



A. List all pairs of congruent angles.

$$\angle A \cong \angle D$$

$$\angle B \cong \angle E$$

$$\angle C \cong \angle F$$

B. Write the ratios of the corresponding side lengths in a statement of proportionality.

$$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$$

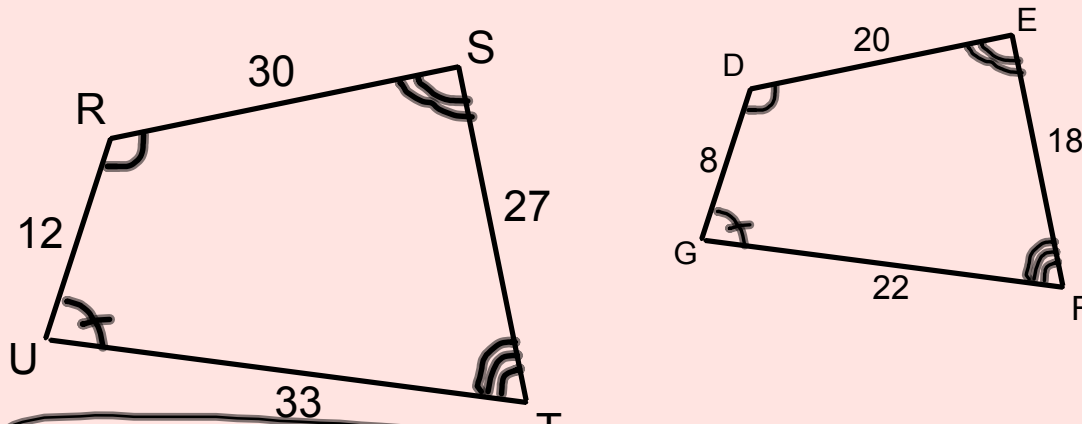
$$\triangle ABC \sim \triangle DEF$$

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## Finding Scale Factor

Determine whether the polygons are similar. If they are, write a similarity statement and find the scale factor.



$$\boxed{RSTU \sim DEFG?}$$

Yes!  
3:2

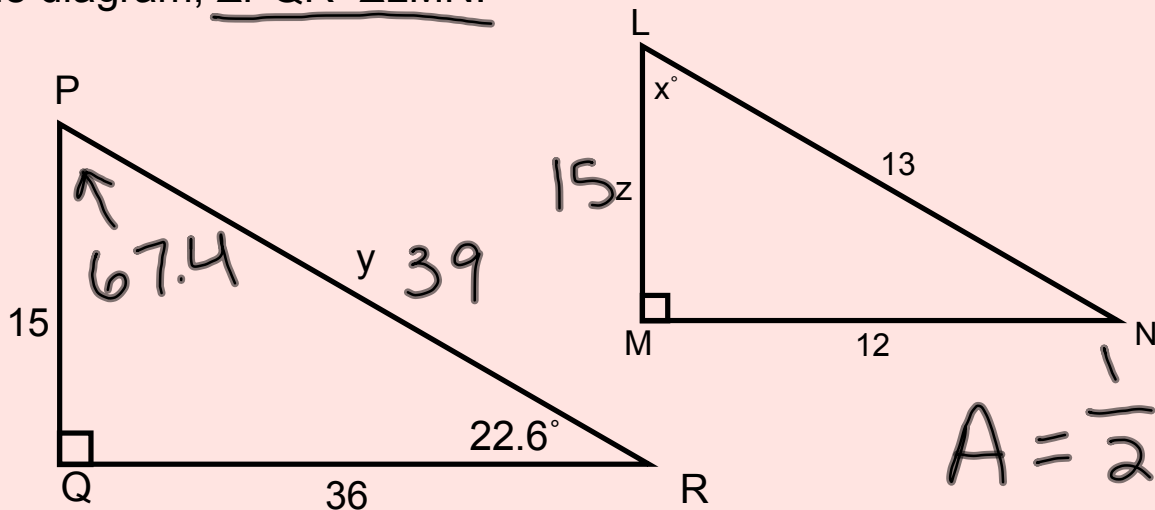
$$\frac{RS}{DE} = \frac{ST}{EF} = \frac{TU}{FG} = \frac{RU}{DG}$$

$$\frac{30}{20} = \frac{27}{18} = \frac{33}{22} = \frac{12}{8}$$

$$\frac{3}{2} = \frac{3}{2} = \frac{3}{2} = \frac{3}{2} \quad \checkmark$$

## Find Perimeters of Similar Figures

In the diagram,  $\triangle PQR \sim \triangle LMN$ .



$$A = \frac{1}{2}bh$$

A. Find the scale factor of  $\triangle PQR$  to  $\triangle LMN$ .

$$\frac{QR}{MN} = \frac{36}{12} = \frac{3}{1} \quad 3 : 1$$

B. Find the values of  $x$ ,  $y$ , and  $z$ .

$$x = 67.4^\circ$$

$$y = 39$$

$$z = 15$$

$$\frac{3}{1} = \frac{y}{13} \quad y = 39$$

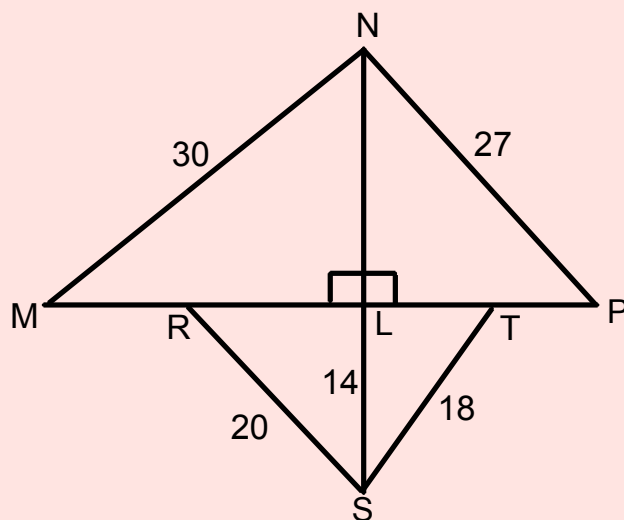
C. Find the perimeter of each triangle.

$$\frac{PQ}{LN} = \frac{15}{13} \quad 3z = 15$$

$$\frac{3}{1} = \frac{15}{z} \quad z = 5$$

## Use a Scale Factor

In the diagram,  $\triangle MNP \sim \triangle RST$ . Find the length of the altitude  $\overline{NL}$ .



## Homework Assignment

**Pg. 376-377**

**#7-12, ~~19-26~~**

23-26

