Chapter 7 Notes – Similarity **Name**_____
Basic Geometry

7.1 Ratio and Proportion

Goal: Use ratios and proportions.

Ratio: a comparison of a number *a* and a nonzero number *b* using _____

Proportion: an equation that states that two ratios are _____

Means: the numbers *b* and *c* in the proportion _____

Extremes: the numbers *a* and *d* in the proportion _____

Simplify the ratio.

a) $6\ days: 15\ days$

b) $\frac{2\ ft}{2\ yd}$

c) $\frac{3\ ft}{18\ in}$

d) $600\ ft : 1\ mi$

e) $\frac{8\ yd}{2\ ft}$

f) $\frac{4\ weeks}{6\ days}$

Cross Product Property
In a proportion, the product of the extremes is equal to the product of the means. $If\ \frac{a}{b} = \frac{c}{d}, then$ _____ = _____

Solve each proportion.

a) $\frac{x}{2} = \frac{7}{14}$

b) $\frac{5}{7} = \frac{y+1}{21}$

c) $\frac{27}{x-5} = \frac{3}{2}$

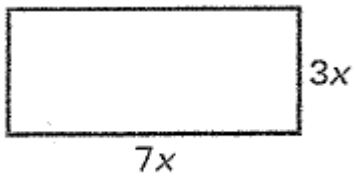
d) $\frac{3}{2} = \frac{9}{x-1}$ e) $\frac{m+2}{5} = \frac{14}{10}$ f) $\frac{39}{72} = \frac{x}{24}$

Find each ratio.

$AB:DE$_____ $BC:DE$_____ $EF:CD$_____ $BD:AE$ _____

The perimeter of a rectangle is 80 feet. The ratio of the length to the width of 7:3. Find the length and the width.

Length: _____ Width: _____



Teresa is maintaining a camp fire. She can keep the fire burning for 4 hours with 6 logs. How many logs does Teresa need to maintain for the fire for 18 hours?

Ms. Blaseg has a candle that is 14 cm tall which burns for 8 hours before going out. How long would a 21 cm tall candle for burn for?

7.2 Similar Polygons

Goal: Identify similar polygons.

Similar Polygons: two polygons whose corresponding angles are _____ and whose corresponding side lengths are _____. They are the same _____ but different _____

Scale Factor: in similar polygons, the ratio of the lengths of two _____

Perimeters of Similar Polygons
If two polygons are similar, then the ratio of their _____ is equal to the ratio of their corresponding side lengths.

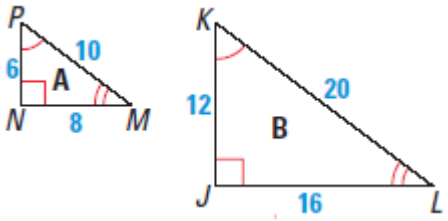
Identify all congruent angles and sides. Then find the scale factor of the left figure to the right figure.

$\Delta PNM \sim \Delta KJL$

Congruent angles: _____≅ _____, _____≅ _____, _____≅ _____

Ratio of Corresponding Sides: _____ = _____ = _____

Scale Factor: _____

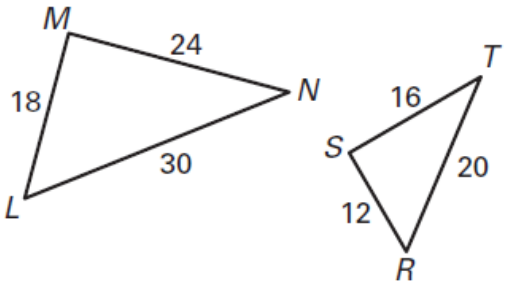


$\Delta LMN \sim \Delta RST$

Congruent angles: _____≅ _____, _____≅ _____, _____≅ _____

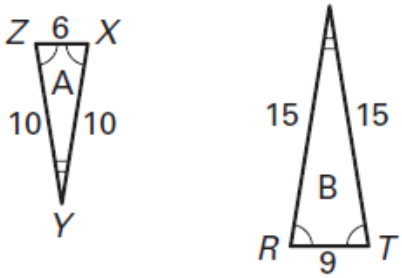
Ratio of Corresponding Sides: _____ = _____ = _____

Scale Factor: _____

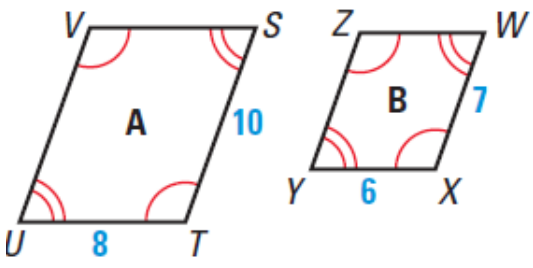


Determine whether the polygons are similar by checking the ratio of all sides. If they are similar, find the scale factor of figure A to figure B.

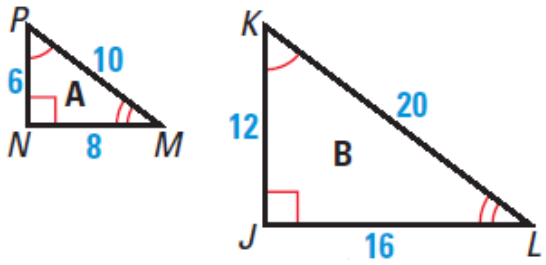
a) Similar? _____ Scale Factor: _____



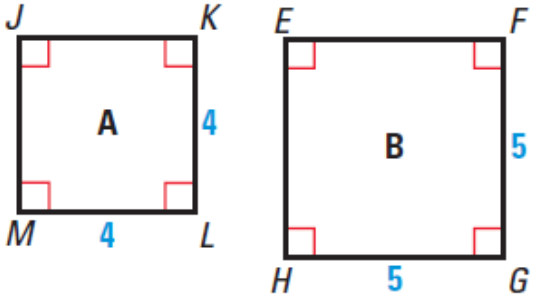
b) Similar? _____ Scale Factor: _____



c) Similar? _____ Scale Factor: _____

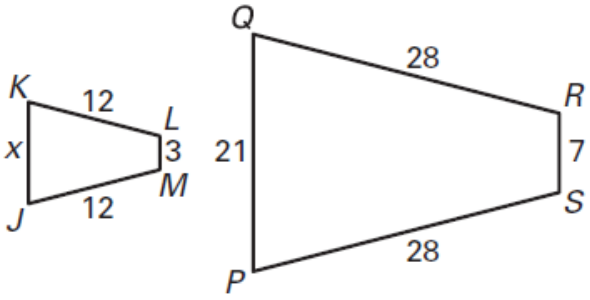


d) Similar? _____ Scale Factor: _____

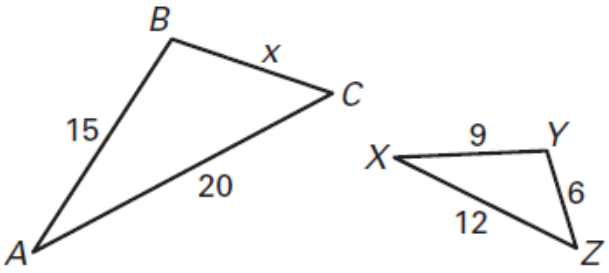


The two polygons are similar. Write a proportion to find the value of each variable.

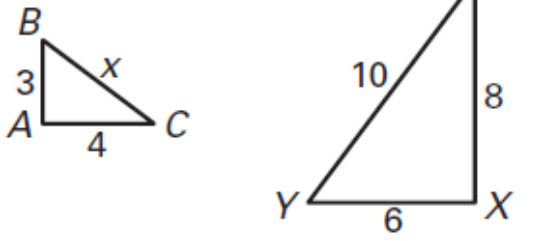
a) x = _____



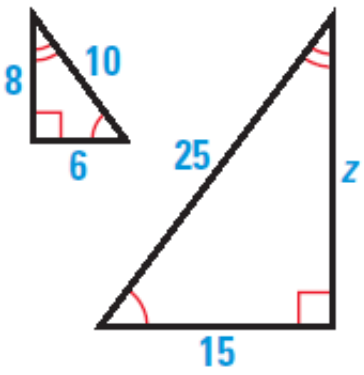
b) x = _____



c) x = _____



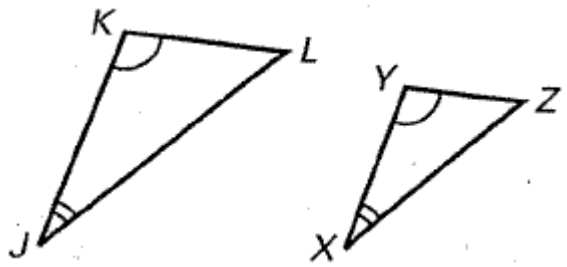
d) z = _____



7.3 Showing Triangles Similar: AA

Goal: Show that two triangles are similar using the AA Similarity Postulate.

Angle-Angle Similarity Postulate (AA)
If two angles of one triangle are congruent to two angles of another triangle, then the two triangles are _____ $If\ \angle$_____ $\cong \angle$____ $and\ \angle$_____ $\cong \angle$_____ $then\ \Delta$_____ $\cong \Delta$_____

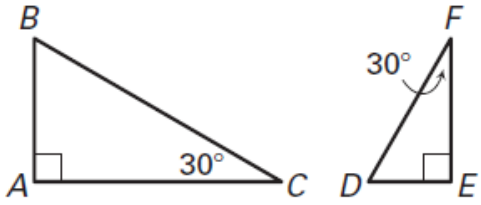


Determine if the triangles are similar. If so, write a similarity statement.

a) Similar?: _____

Postulate: _____

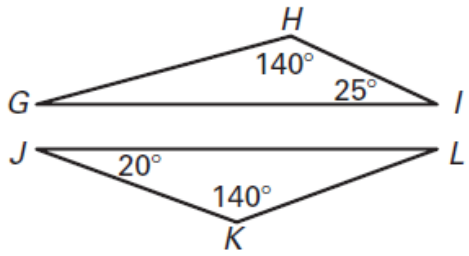
Statement: _____ ~ _____



b) Similar?: _____

Postulate: _____

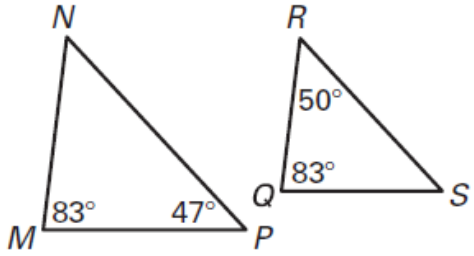
Statement: _____ ~ _____



c) Similar?: _____

Postulate: _____

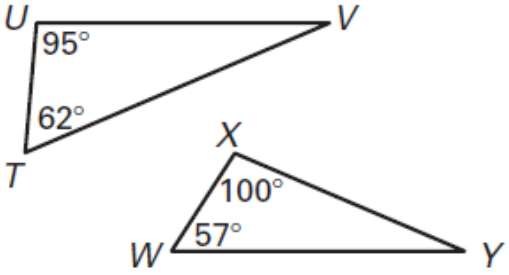
Statement: _____ ~ _____



d) Similar?: _____

Postulate: _____

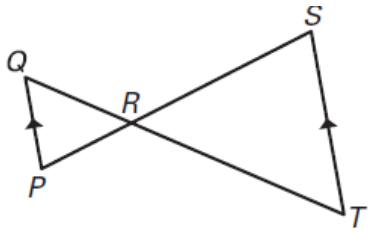
Statement: _____ ~ _____



e) Similar?: _____

Postulate: _____

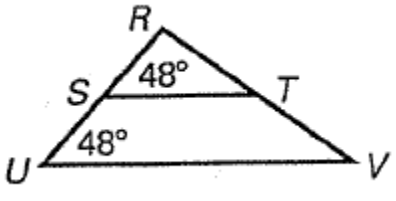
Statement: _____ ~ _____



f) Similar?: _____

Postulate: _____

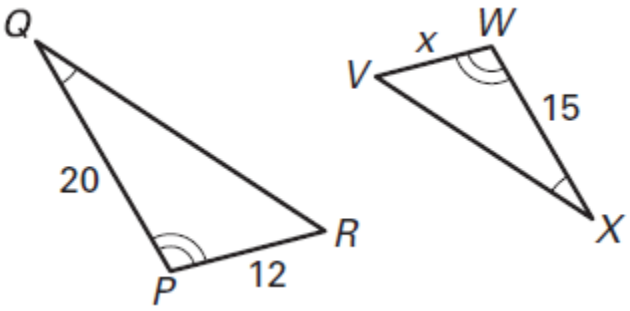
Statement: _____ ~ _____



Write the similarity statement for the triangles. Then find the value of the variable.

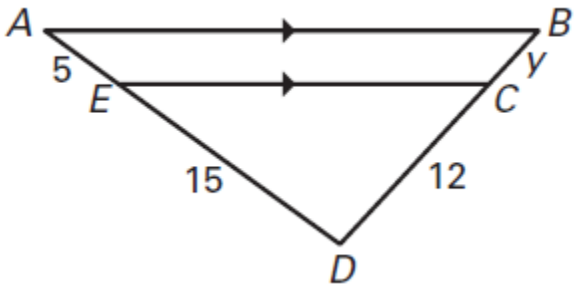
a) Statement: _____ ~ _____

x = _____



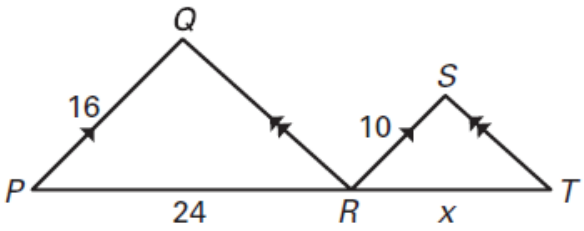
b) Statement: _____ ~ _____

y = _____



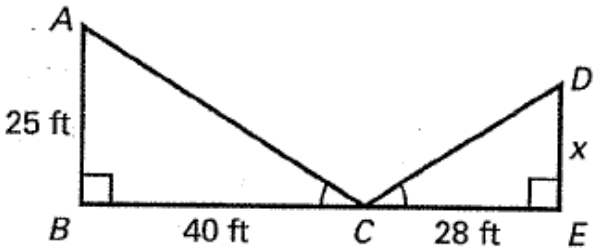
c) Statement: _____ ~ _____

x = _____



d) Statement: _____ ~ _____

x = _____



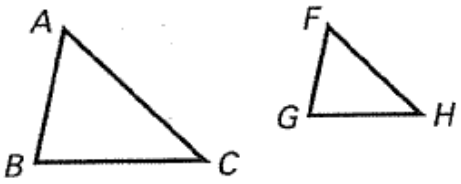
7.4 Showing Triangles Similar: SSS and SAS

Goal: Show that two triangles are similar using the SSS and SAS Similarity Postulates.

Side-Side-Side (SSS) Similarity Theorem

If the corresponding sides of two triangles are _____, then the triangles are similar.

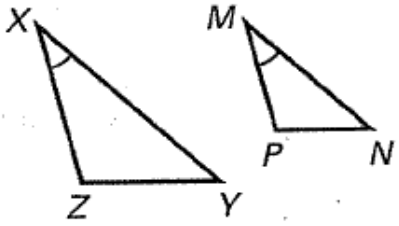
If _____ $=$ _____ $=$ _____$,then\ \Delta ABC \sim \Delta FGH$



Side-Angle-Side (SAS) Similarity Theorem

If an angle of one triangle is congruent to an _____ of a second triangle and the lengths of the sides that include these angles are _____ then the triangles are similar.

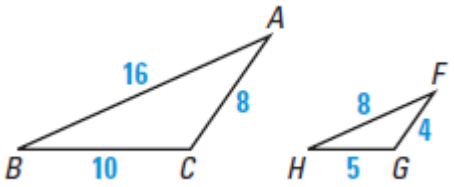
$If\ \angle X \cong \angle$_____ $and\ \frac{PM}{ZX} =$ ——, then $\Delta XYZ \sim \Delta MNP$



Determine whether the triangles are similar. If they are similar, state why and write a similarity statement.

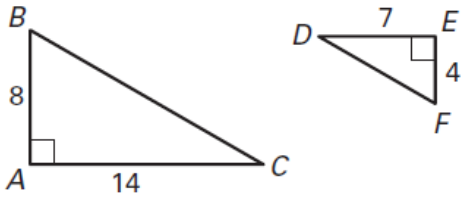
a) Similar?: _____ Postulate: _____

Statement: _____ ~ _____



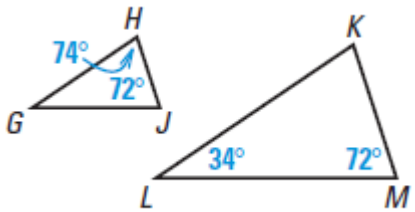
b) Similar?: _____ Postulate: _____

Statement: _____ ~ _____



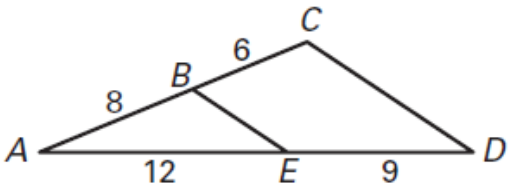
c) Similar?: _____ Postulate: _____

Statement: _____ ~ _____



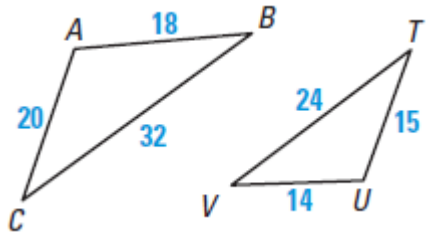
d) Similar?: _____ Postulate: _____

Statement: _____ ~ _____



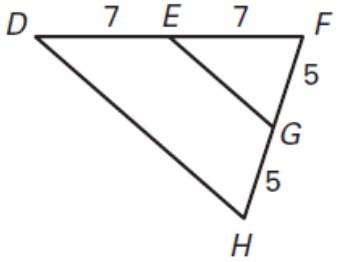
e) Similar?: _____ Postulate: _____

Statement: _____ ~ _____



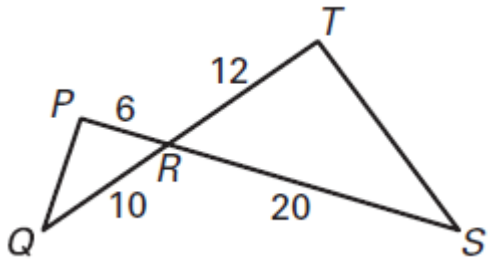
f) Similar?: _____ Postulate: _____

Statement: _____ ~ _____



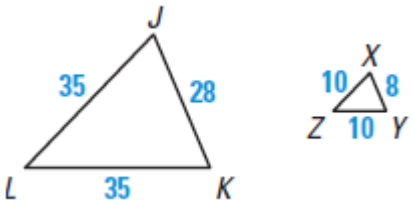
g) Similar?: _____ Postulate: _____

Statement: _____ ~ _____



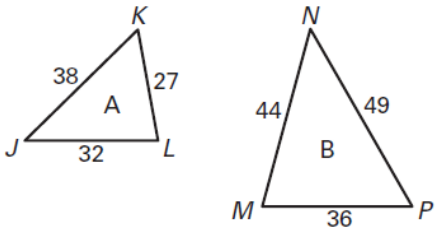
h) Similar?: _____ Postulate: _____

Statement: _____ ~ _____

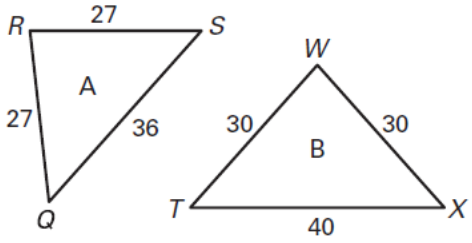


Determine whether the two triangles are similar by SSS. If they are similar, find the scale factor of Triangle B to Triangle A.

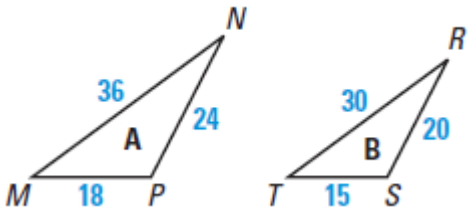
a) Similar? _____ Scale Factor: _____



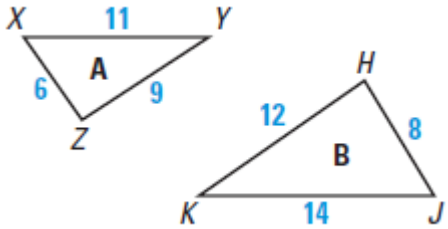
b) Similar? _____ Scale Factor: _____



c) Similar? _____ Scale Factor: _____



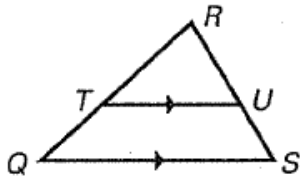
d) Similar? _____ Scale Factor: _____



7.5 Proportions and Similar Triangles

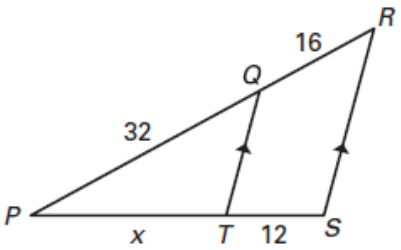
Goal: Use the Triangle Proportionality Theorem and its converse.

Midsegment of a triangle: a segment that connects the _____ of two sides of a triangle

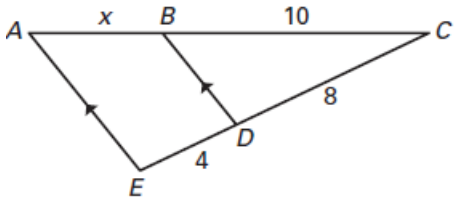
Triangle Proportionality Theorem
If a line parallel to one side of a triangle intersects the other two sides, then it divides the two sides _____ $In\ \Delta QRS, if\ \overline{TU} \parallel \overline{QS}\ then \frac{RT}{QT} =$ _____ 

Use the Triangle Proportionality Theorem to find the value of the variable.

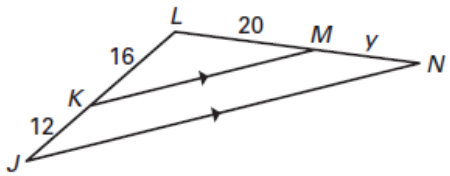
a) x = _____



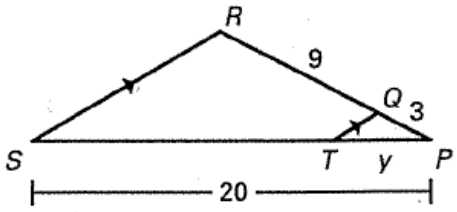
b) x = _____



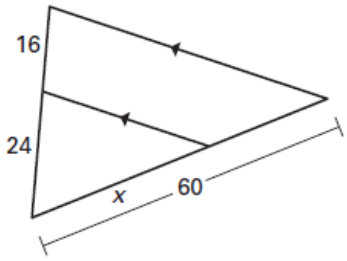
c) y = _____



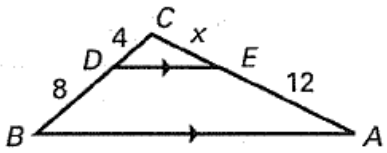
d) y = _____

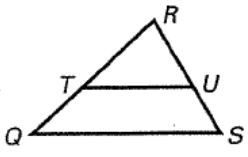


e) x = _____



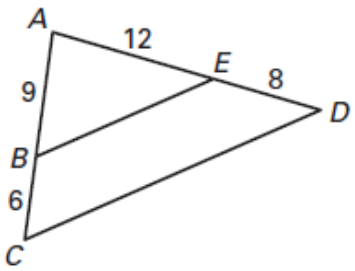
f) x = _____

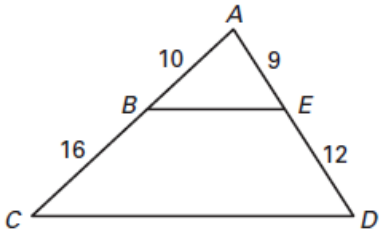


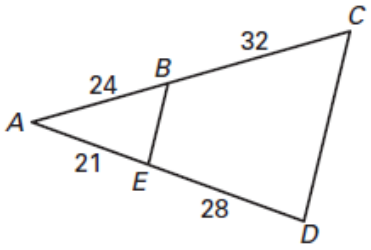
Converse of the Triangle Proportionality Theorem
If a line divides two sides of a triangle proportionally, then is it _____ to the third side. $In\ \Delta QRS, if\ \frac{RT}{TQ} and \frac{RU}{US}, then$ _____ ∥ _____ 

Given the diagram, determine whether $\overline{BE}$ is parallel to $\overline{CD}$. *Explain.*

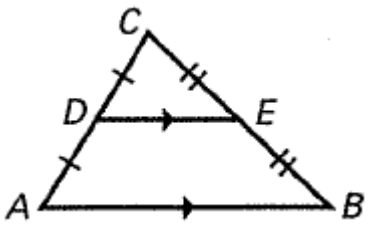
a) _____ b) _____ c) _____





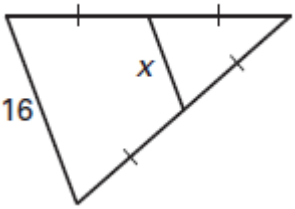


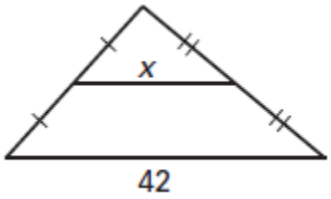
Midsegment Theorem
The segment connecting the midpoints of two sides of a triangle is _____ to the third side and is _____ as long. $In\ \Delta ABC, if\ CD = DA\ and\ CE = EB, then$ _____ ‖ _____ $and\ DE =$ _____

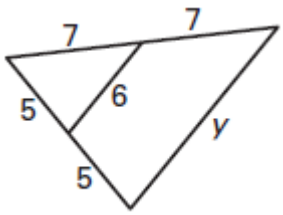


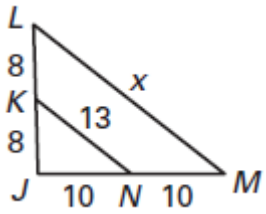
Find the value of each variable.

a) x = _____ b) x = _____ c) y = _____ d) x = _____









Complete each statement.

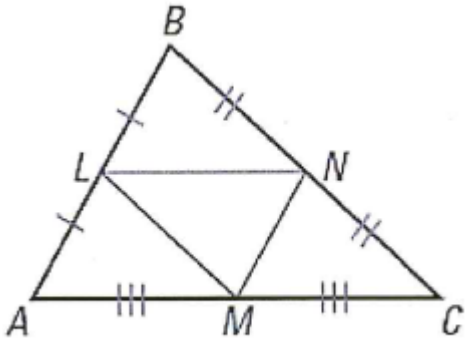
$\overline{AC}$ ‖ _____

$\overline{BC}$ ‖ _____

If AB = 32, then MN = _____

If LM = 17, then BC = _____

If BL = 4.5, then MN = _____



.0

7.6 Dilations

Goal: Identify dilations and scale factors.

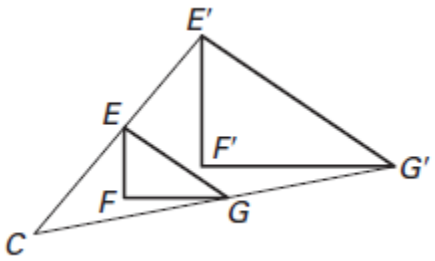
Dilation: a transformation that changes the _____ of a figure

Reduction: a dilation in which the image is _____ than the original figure

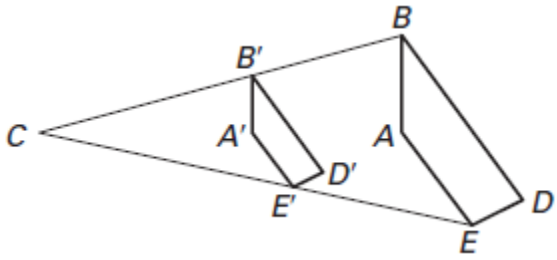
Enlargement: a dilation in which the image is _____ than the original figure

Tell whether the dilation is a reduction or an enlargement.

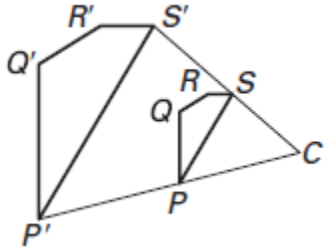
a) _____



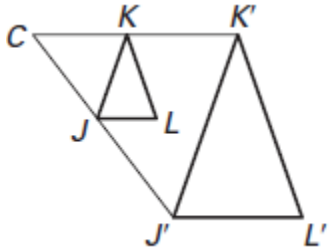
b) _____



c) _____



d) _____

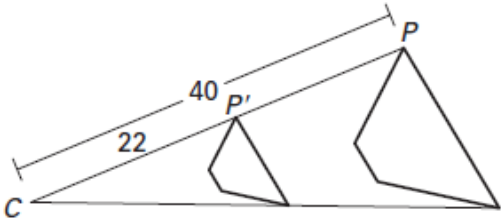


To find the scale factor of a dilation, simplify the ratio: _____

Determine if the dilation is an enlargement or reduction. Then find the scale factor of the dilation.

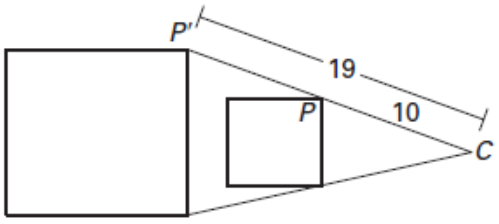
a) _____

Scale Factor: _____



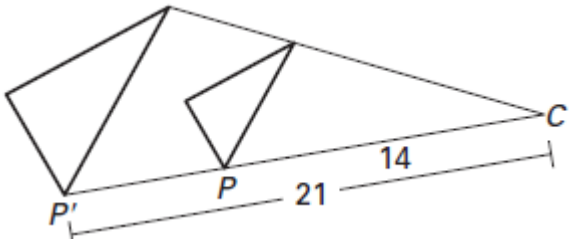
b) _____

Scale Factor: _____



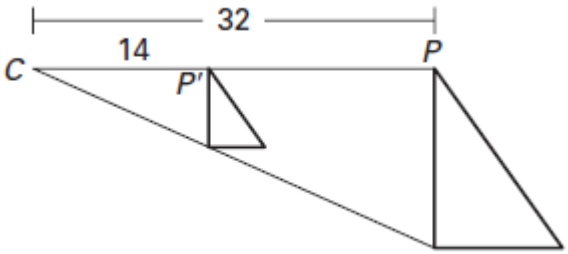
c) _____

Scale Factor: _____



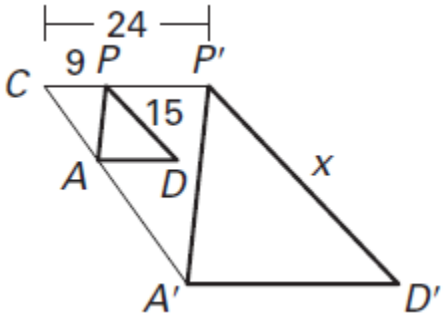
d) _____

Scale Factor: _____

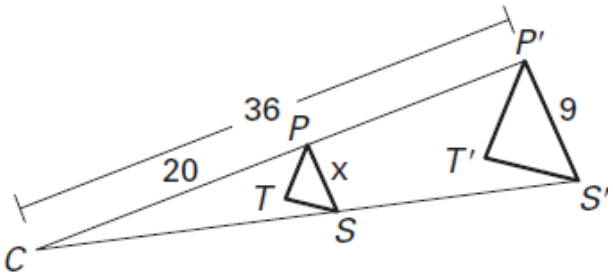


Find the value of the variable.

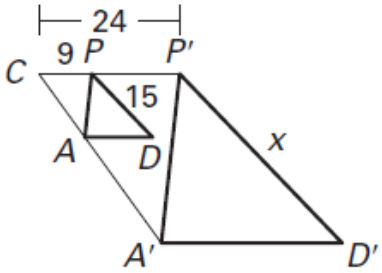
a) x = _____



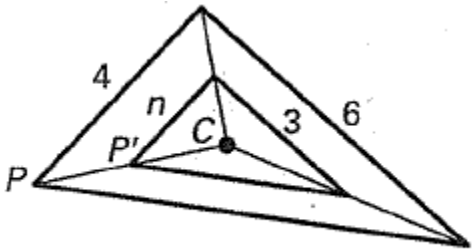
b) x = _____



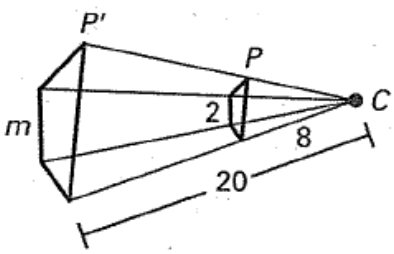
c) x = _____



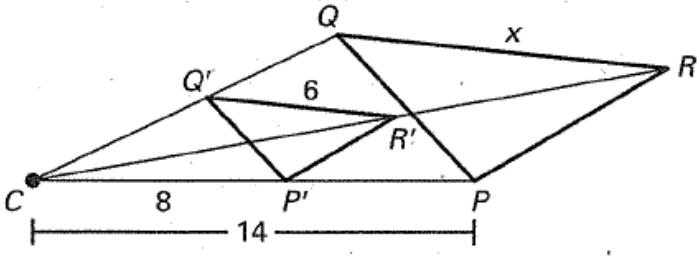
d) n = _____



e) m = _____



f) x = _____



7.6 Extension – Dilations on the Coordinate Plane

Goal: Graph dilations on the coordinate plane.

Dilate: to _____ or _____ a figure

Scale Factor: determines how much a figure is being enlarged or reduced.

*A scale factor greater than one _____ a figure

* A scale factor between 0 and 1 _____ a figure

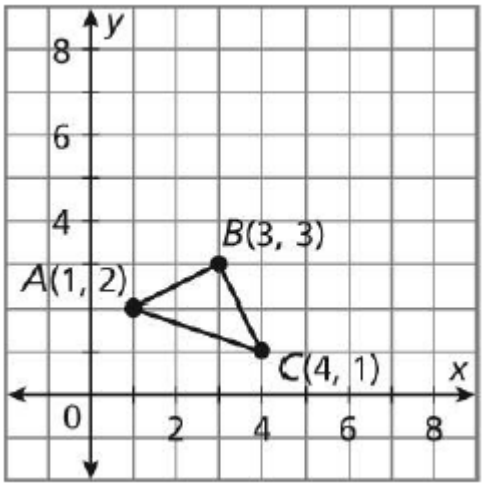
Identify the coordinates of the pre-image. Then use the scale factor to graph and identify the coordinates of the image.

a) Scale Factor: 2

A: _____ A': _____

B: _____ B': _____

C: _____ C': _____

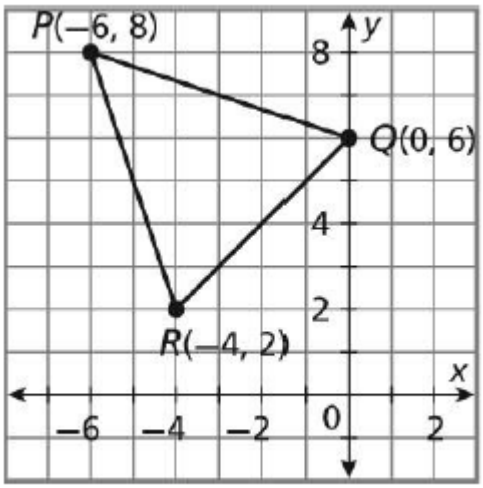


b) Scale Factor: ½

P: _____ P': _____

Q: _____ Q': _____

R: _____ R': _____



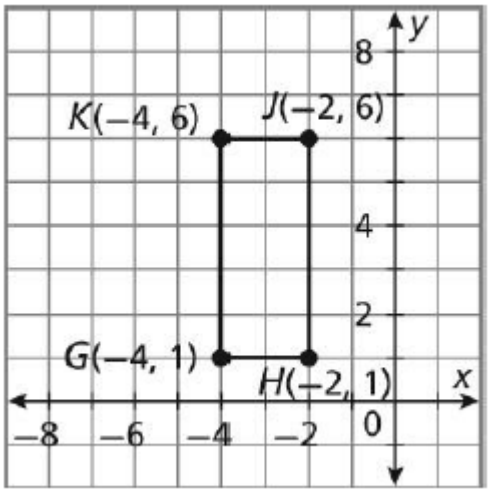
c) Scale Factor: 1.5

G: _____ G': _____

H: _____ H': _____

J: _____ J': _____

K: _____ K': _____



d) Scale Factor: ¾

E: _____ E': _____

F: _____ F': _____

G: _____ G': _____

H: _____ H': _____