

MAKING & USING A STUDY GUIDE

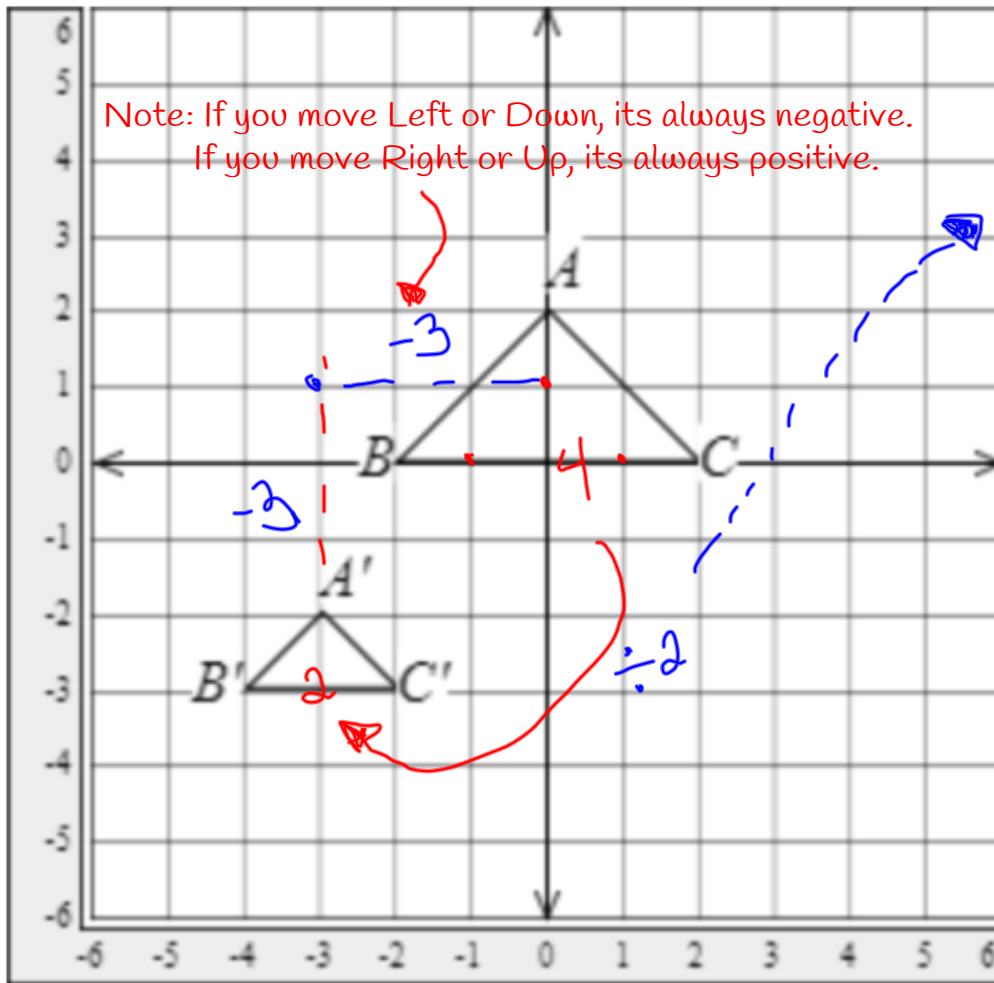
Exam-1: Similarity and Transformations

Study Guide: helps you ① summarize,
② visualize, and analyze ③
concepts learned in class

* Warning: simply making a study guide
does not guarantee you an
A+ on the test.

Enter the rule used to transform $\triangle ABC$. If there is a dilation, dilate with respect to the origin.

1



First, compress $\triangle ABC$

$$\left(\frac{x}{2}, \frac{y}{2}\right)$$

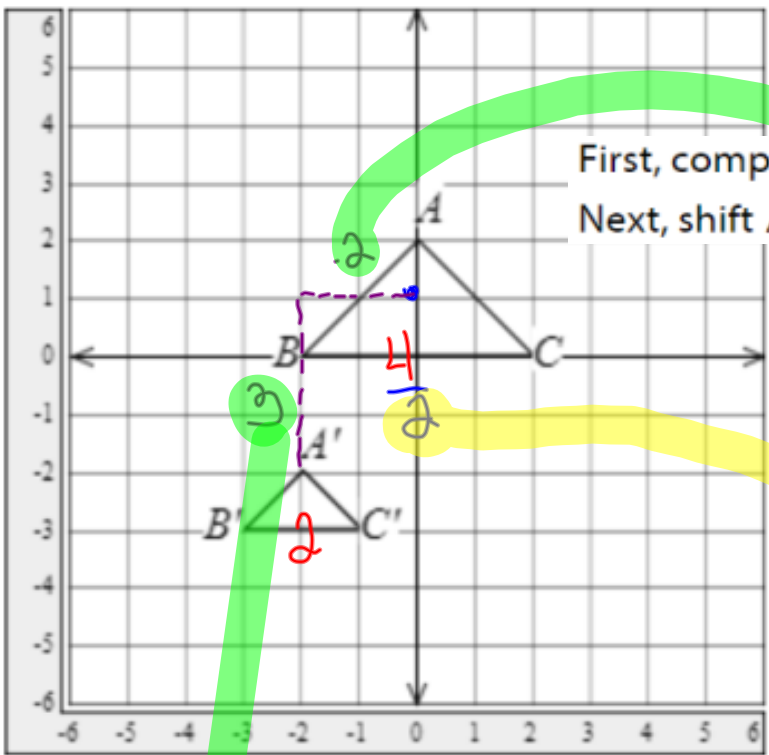
Next, shift $\triangle A''B''C''$

$$(x, y) \rightarrow \left(\frac{x}{2} - 3, \frac{y}{2} - 3\right)$$

The rule used to transform $\triangle ABC$ is $(x, y) \rightarrow \left(\frac{x}{2} - 3, \frac{y}{2} - 3\right)$

Complete the description of the transformation shown $\triangle ABC$ to $\triangle A'B'C'$.

2

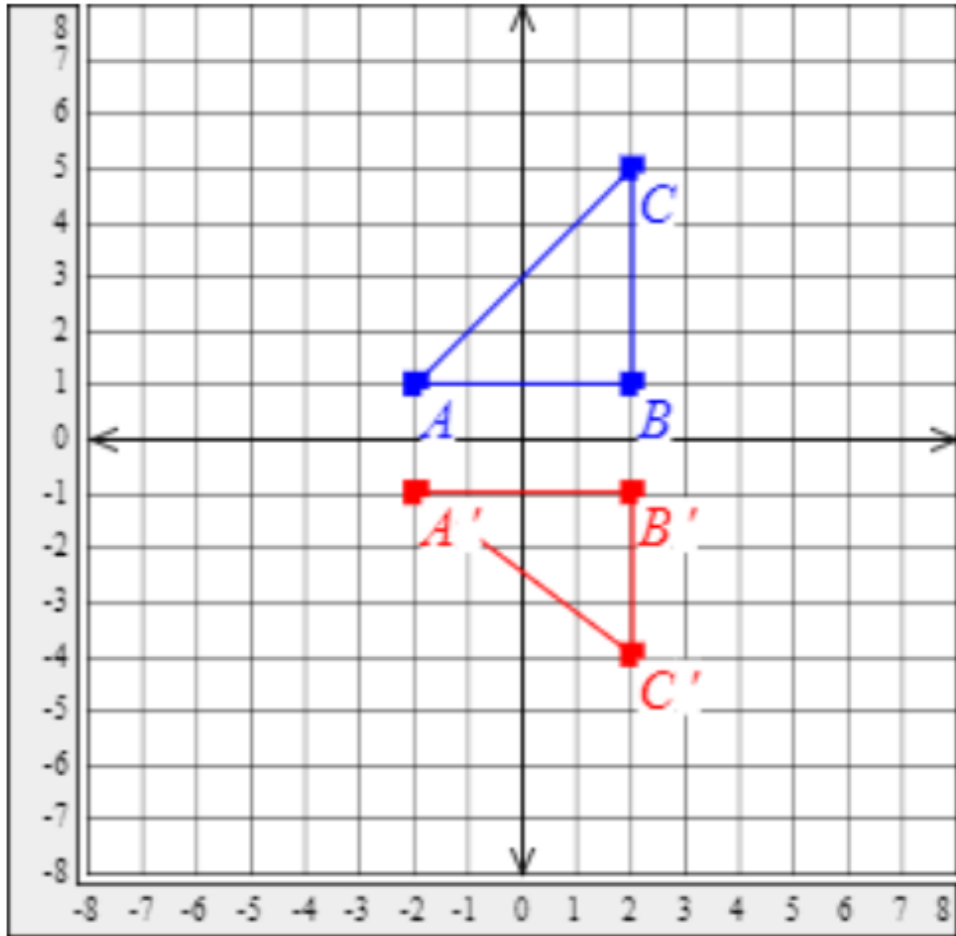


First, compress $\triangle ABC$ around the origin by a factor of 2.
Next, shift $\triangle A''B''C''$ down 3 units and left 2 units.

Compress $\triangle ABC$ vertically and horizontally by a factor of , then shift it to the left unit(s) and down unit(s).

Determine if the transformation is a dilation.

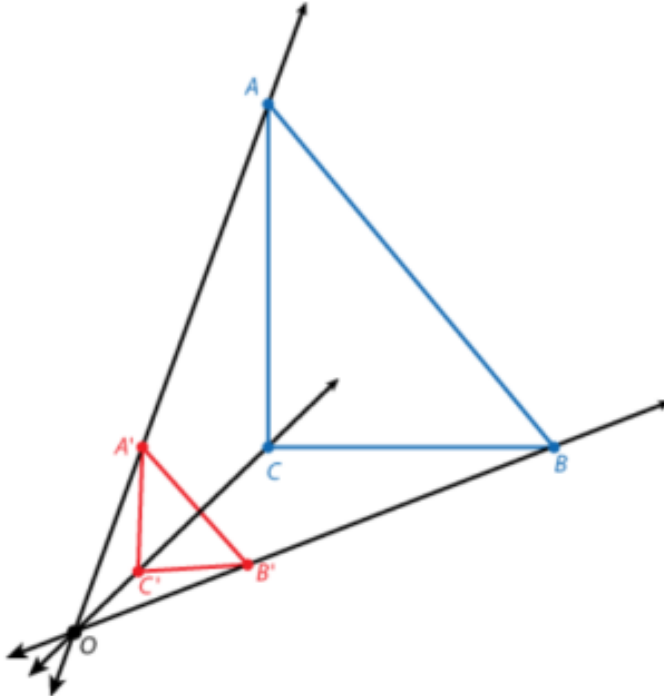
3



The transformation a dilation.

Note: Dilation is change in the size of the image, not a flip.

Determine the scale factor of the dilation of the triangles.



$$OA' = 4$$
$$OA = 8$$

$$\frac{OA'}{OA} = \frac{4}{8} = \frac{1}{2}$$

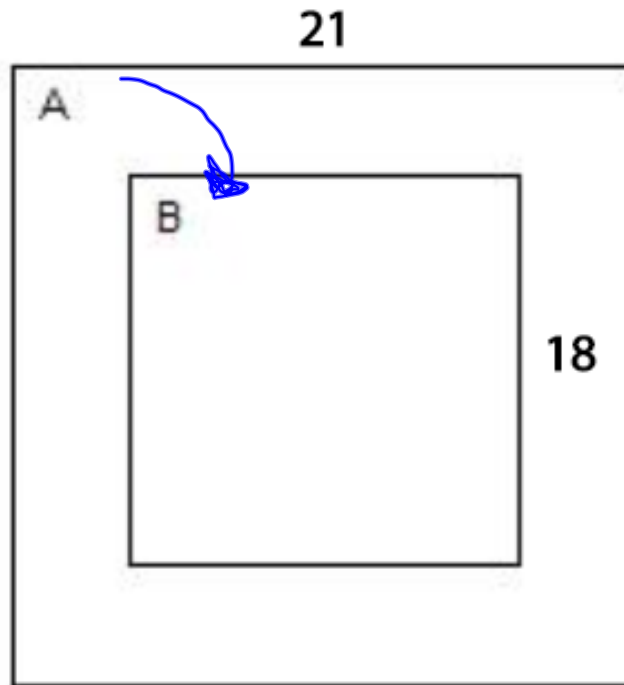
The scale factor of the dilation is

$$\frac{1}{2}$$

$$4$$

Square B is a dilation of square A . What is the scale factor?

5

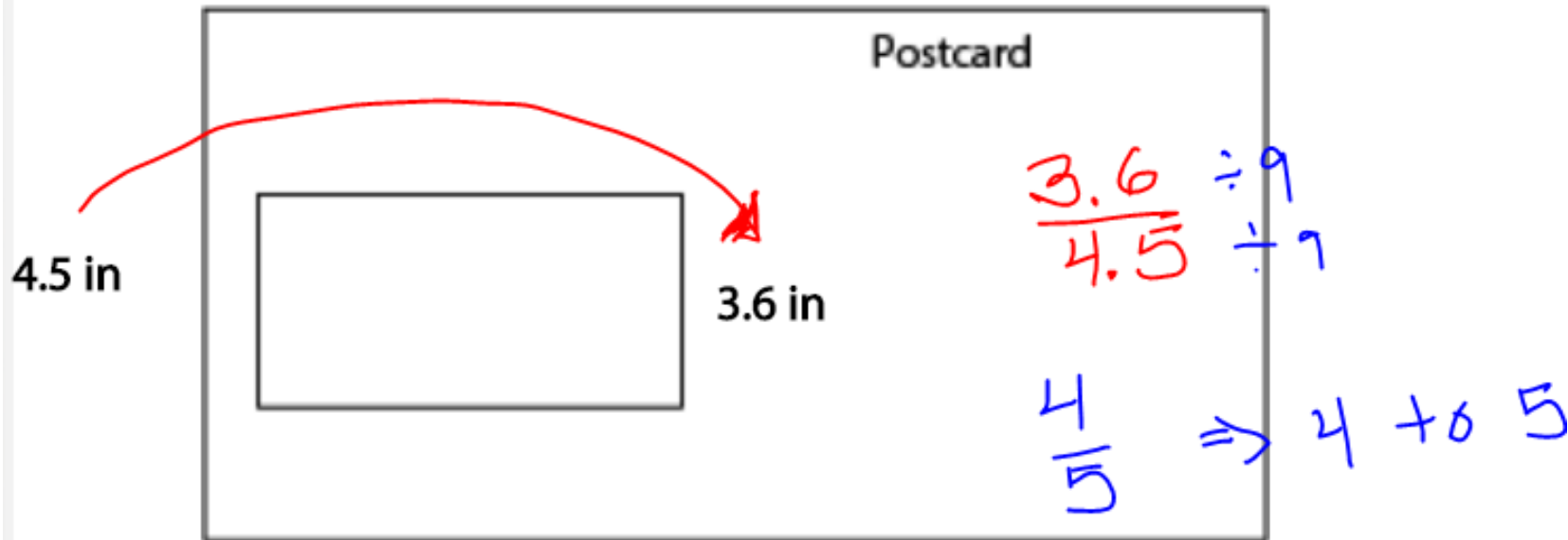


$$\frac{B}{A} = \frac{18}{21} = \frac{6}{7}$$

The scale factor is $\frac{6}{7}$.

You work at a photography store. A customer has a picture that is 4.5 inches tall. The customer wants a reduced copy of the picture to fit a space of 3.6 inches tall on a postcard. What scale factor should you use to reduce the picture to the correct size?

6

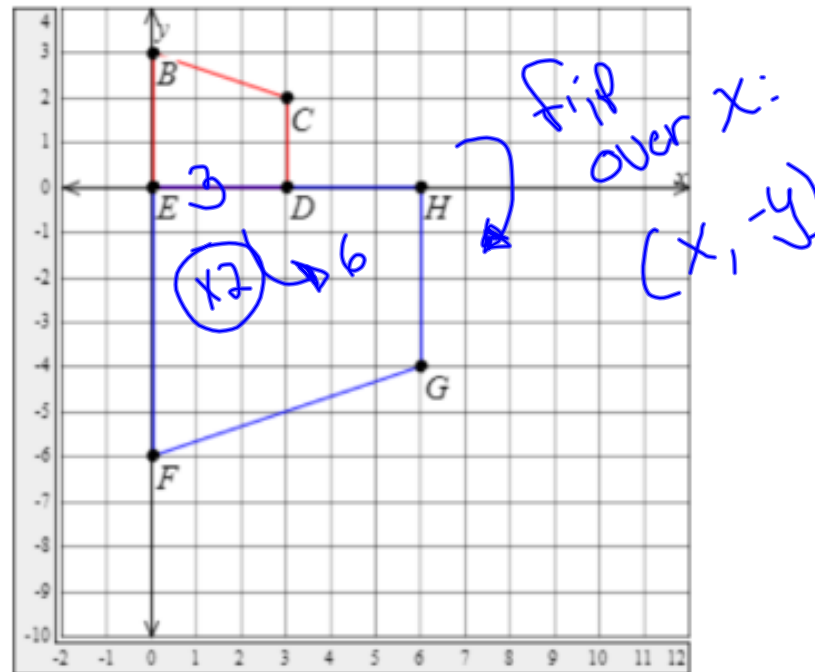


A scale factor of to should be used.

For the similar figures, find a sequence of similarity transformations that maps one figure to the other. Complete the coordinate notation for each transformation.

7

Map $ABCD$ to $EFGH$.



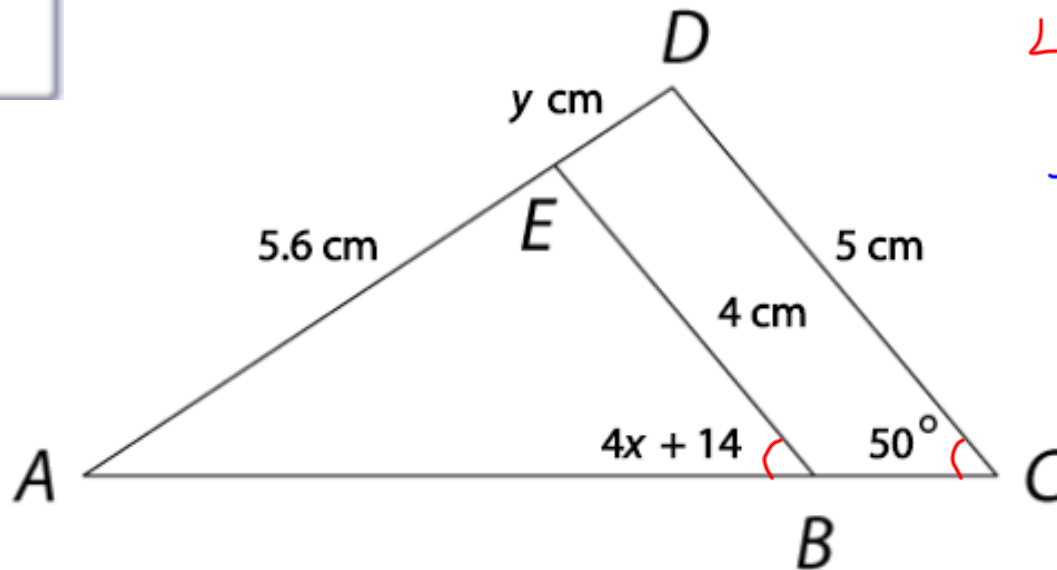
You can map $ABCD$ to $EFGH$ by a reflection followed by a dilation. Drag and drop the ordered pair into the transformations to complete the coordinate notation.

The reflection is $(x, y) \rightarrow$

The dilation is $(x, y) \rightarrow$

Use the diagram in which $\triangle ABE \sim \triangle ACD$.

8



Solve for x

$$\begin{array}{r} 4x + 14 = 50 \\ -14 \quad -14 \\ \hline 4x = 36 \\ \frac{4x}{4} = \frac{36}{4} \end{array}$$

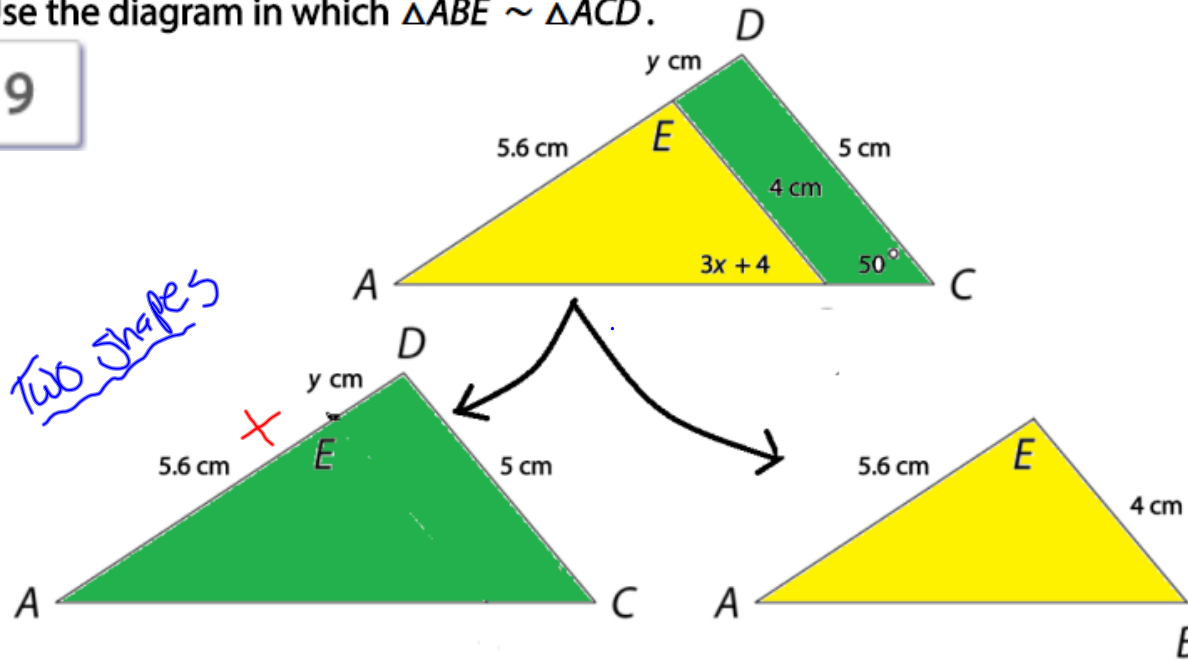
$x = 9$

Find the value of x.

The value of x is

Use the diagram in which $\triangle ABE \sim \triangle ACD$.

9



Find the value of y .

$$\frac{AD}{AE} = \frac{CD}{BE}$$

$$\frac{5.6 + y}{5.6} = \frac{5}{4} \quad \text{Substitute the lengths of } AD, AE, BE, \text{ and } CD.$$

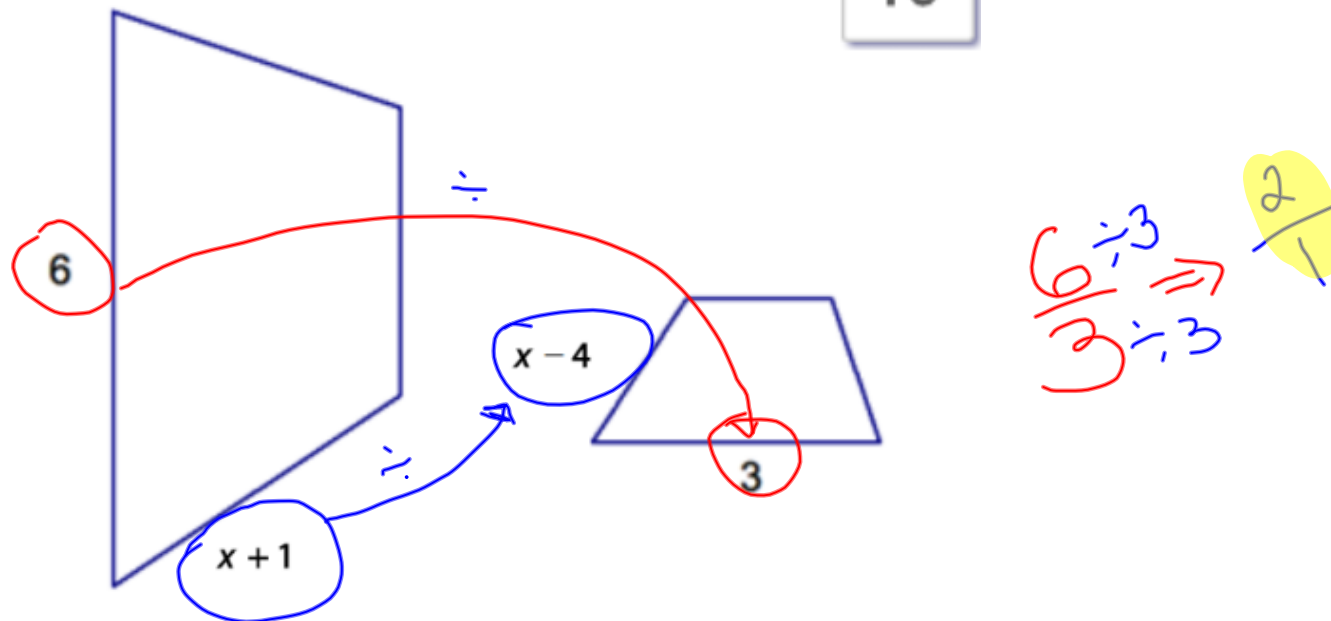
$$5.6 + y = \frac{5}{4} \cdot 5.6 \quad \text{Multiply both sides by } 5.6.$$

$$5.6 + y = 7 \quad \text{Simplify the right side.}$$

$$y = 1.4 \quad \text{Subtract } 5.6 \text{ from both sides.}$$

The figures in the picture are similar to each other. Find the value of x , rounded to the nearest whole number.

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The value of x is .

The longer bases of the trapezoids are 6 units and 3 units, so the scale factor is 2:1

$$\frac{(x + 1)}{(x - 4)} = \frac{2}{1} \quad \text{Set up the proportion.}$$

$$x + 1 = 2(x - 4) \quad \text{Multiply both sides by } (x - 4).$$

$$x + 1 = 2x - 8 \quad \text{Distribute the 2.}$$

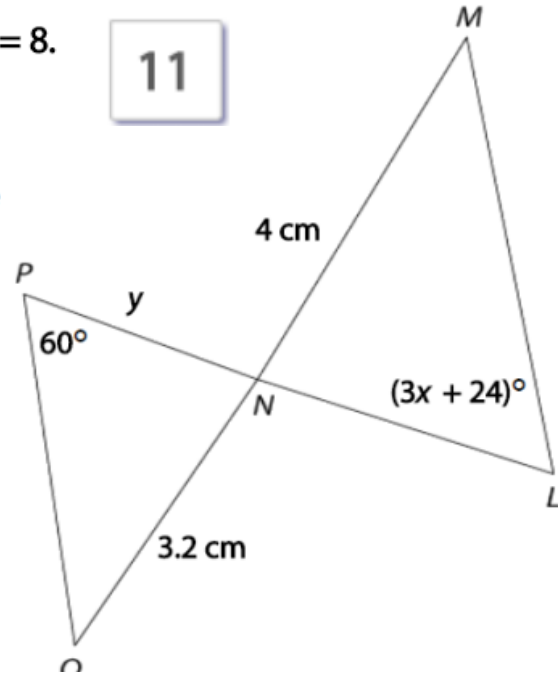
$$9 = x \quad \text{Subtract } x \text{ from both sides and add 8 to both sides.}$$

In the diagram, $\triangle NPQ \sim \triangle NLM$ and $PL = 8$.

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a. Find the value of x .

Since $\triangle NPQ$ is similar to $\triangle NLM$,
 $\angle L \cong \angle P$ and the measure of their angles are
 $3x + 24 = 60$ Set $m \angle L$ equal to $m \angle P$.
 $3x = 36$ Subtract 24 from both sides.
 $x = 12$ Divide both sides by 3.



b. Find the lengths NP and NL , rounding to the nearest hundredth.

$$\frac{NL}{NM} = \frac{NP}{NQ}$$

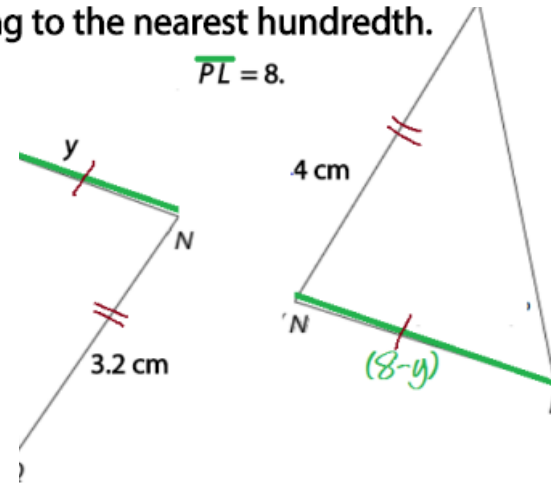
$$\frac{8 - y}{4} = \frac{y}{3.2}$$

$$3.2(8 - y) = 4y$$

$$25.6 - 3.2y = 4y$$

$$25.6 = 7.2y$$

$$3.56 = y$$



So, $NP = 3.56$ and $NL = 8 - 3.56 = 4.44$.

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$\triangle MNO$ maps to $\triangle RST$ with the transformation $(x, y) \rightarrow \left(\frac{1}{3}x, \frac{1}{3}y\right)$. Choose True or False for each statement.

Divide by 3

A. If $RT = 3, MO = 9$.

~~A~~ True **B** False

$\triangle MNO$ maps to $\triangle RST$
 $\frac{9}{3} = 3$

B. If $RT = 12, MO = 4$.

A True ~~B~~ False

$\triangle MNO$ maps to $\triangle RST$
 $\frac{4}{3} \neq 12$

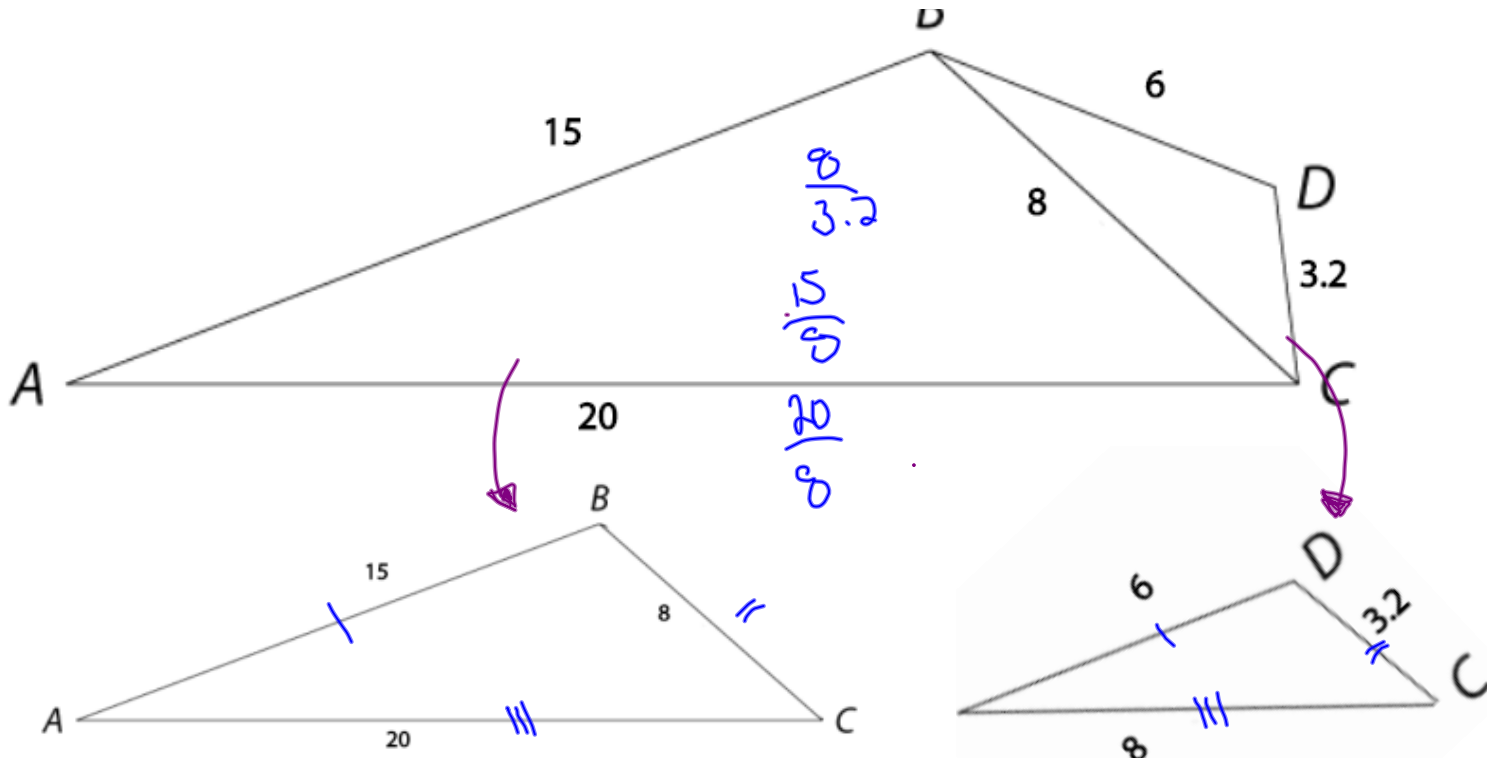
C. If $RT = 9, MO = 27$.

~~A~~ True **B** False

$\triangle MNO$ maps to $\triangle RST$
 $\frac{27}{3} = 9$

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Show whether or not the pair of triangles is similar. Complete the justification of your answer, and select a similarity statement if the triangles are similar.



$$\frac{BC}{DC} = \frac{8}{3.2}$$

$$\frac{AB}{BD} = \frac{15}{6}$$

$$\frac{AC}{BC} = \frac{20}{8}$$

Same amount

$\triangle ABC$ and $\triangle BDC$ are similar by the SSS Triangle Similarity Theorem

Find the appropriate statements about the triangles.

$\triangle ABC$ is similar to $\triangle RTS$. Complete a proportion that contains \overline{AC} and \overline{RT} . Also complete the angle congruence statements that must be true.

$$\frac{\overline{AC}}{RS} = \frac{AB}{RT}$$

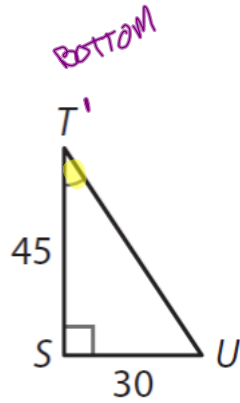
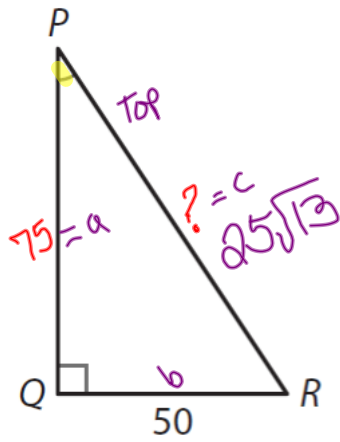
$$\angle A \cong \angle R$$

$$\angle B \cong \angle T$$

$$\angle C \cong \angle S$$

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Find the missing lengths. If needed, give the answer in simplest radical form.



PQ =

$$\frac{PQ}{TS} = \frac{QR}{SU}$$

$$\frac{PQ}{45} = \frac{50}{30}$$

$$\frac{PQ}{45} = \frac{5}{3}$$

$$PQ = \frac{5(45)}{3}$$

PQ = 75

PR =

Pythagorean Theorem:
 $a^2 + b^2 = c^2$

$$75^2 + 50^2 = c^2$$

$$5625 + 2500 = c^2$$

$$\sqrt{8125} = \sqrt{c^2}$$

$$\sqrt{625 \cdot 13} = c$$

$$25\sqrt{13} = c$$

TU =

Scale factor

$$\frac{30}{50} = \frac{3}{5}$$

$$\left(\frac{3}{5}\right) 25\sqrt{13}$$

15\sqrt{13}