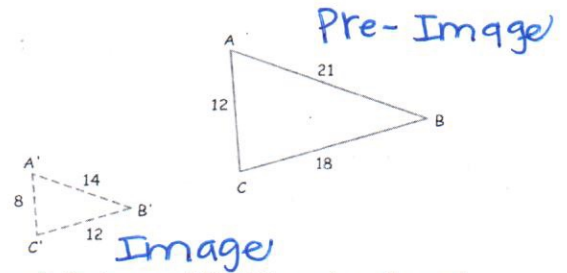


1. The following transformation represents a dilation. Determine the scale factor and whether the dilation is an enlargement, reduction or congruency transformation.

Reduction

$$k = \frac{\text{Image}}{\text{Pre-Image}} = \frac{8}{12} = \boxed{\frac{2}{3} = k}$$



2. Identify whether the dilation is an enlargement or reduction, find its scale factor, and find the value of x and y.

Enlargement

$$k = \frac{9}{4}$$

$$\frac{9}{4} = \frac{x}{3}$$

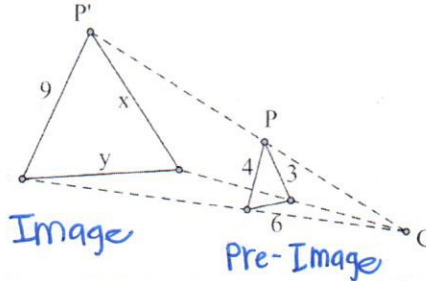
$$4x = 27$$

$$x = 6.75$$

$$\frac{9}{4} = \frac{y}{6}$$

$$4y = 54$$

$$y = 13.5$$



3. If $\triangle ABC$ has vertices with coordinates $A(8,4)$, $B(9,2)$, and $C(4,12)$, what are the vertices of $\triangle A'B'C'$ under a dilation with a scale factor of 3 with a center of dilation at the origin?

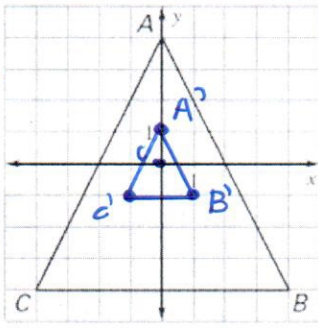
$$\begin{array}{l} \uparrow 8 \rightarrow 24 \\ \times 3 \quad \times 3 \\ \hline \uparrow 24 \rightarrow 12 \end{array} \quad \begin{array}{l} \uparrow 9 \rightarrow 27 \\ \times 3 \quad \times 3 \\ \hline \uparrow 27 \rightarrow 6 \end{array} \quad \begin{array}{l} \uparrow 4 \rightarrow 12 \\ \times 3 \quad \times 3 \\ \hline \uparrow 12 \rightarrow 36 \end{array}$$

$$\begin{array}{l} A' (24, 12) \\ B' (27, 6) \\ C' (12, 36) \end{array}$$

Dilate each figure according to the given scale factor with a center of dilation at the origin, $(0, 0)$.

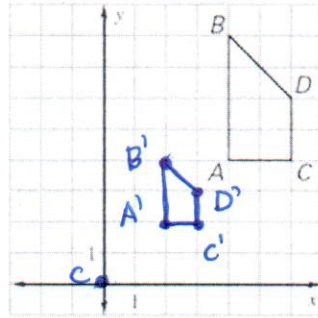
4. $k = \frac{1}{4}$

$$\begin{array}{l} \uparrow 4 \rightarrow 1 \\ \times \frac{1}{4} \quad \times \frac{1}{4} \\ \hline \uparrow 1 \rightarrow 0 \end{array} \quad \begin{array}{l} \downarrow 4 \rightarrow 1 \\ \times \frac{1}{4} \quad \times \frac{1}{4} \\ \hline \downarrow 1 \rightarrow 1 \end{array} \quad \begin{array}{l} \downarrow 4 \rightarrow 1 \\ \times \frac{1}{4} \quad \times \frac{1}{4} \\ \hline \downarrow 1 \rightarrow 1 \end{array}$$



5. $k = \frac{1}{2}$

$$\begin{array}{l} A \uparrow 4 \rightarrow 2 \\ \times \frac{1}{2} \quad \times \frac{1}{2} \\ \hline \uparrow 2 \rightarrow 2 \end{array} \quad \begin{array}{l} C \uparrow 4 \rightarrow 2 \\ \times \frac{1}{2} \quad \times \frac{1}{2} \\ \hline \uparrow 2 \rightarrow 3 \end{array} \quad \begin{array}{l} B \uparrow 8 \rightarrow 4 \\ \times \frac{1}{2} \quad \times \frac{1}{2} \\ \hline \uparrow 4 \rightarrow 2 \end{array} \quad \begin{array}{l} D \uparrow 6 \rightarrow 3 \\ \times \frac{1}{2} \quad \times \frac{1}{2} \\ \hline \uparrow 3 \rightarrow 3 \end{array}$$

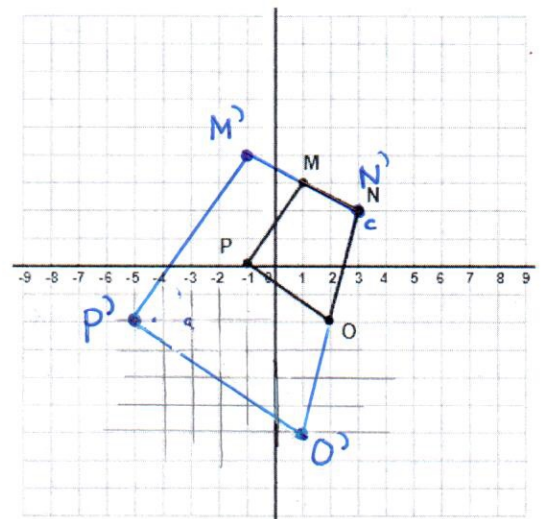


6. Dilate the figure by a scale factor of 2, with center at (3,2). List the coordinates of the points.

$$\begin{array}{l} M \uparrow 1 \rightarrow 2 \\ \times 2 \quad \times 2 \\ \hline \uparrow 2 \rightarrow 4 \end{array} \quad \begin{array}{l} O \downarrow 4 \rightarrow 0 \\ \times 2 \quad \times 2 \\ \hline \downarrow 8 \rightarrow 2 \end{array}$$

$$\begin{array}{l} P \downarrow 2 \rightarrow 0 \\ \times 2 \quad \times 2 \\ \hline \downarrow 4 \rightarrow 0 \end{array}$$

M: (1,3)	M': (-1,4)
N: (3,2)	N': (3,2)
O: (2,-2)	O': (1,-6)
P: (-1,0)	P': (-5,-2)



7. Verify that this is a dilation by checking that:

a) The corresponding sides are proportional

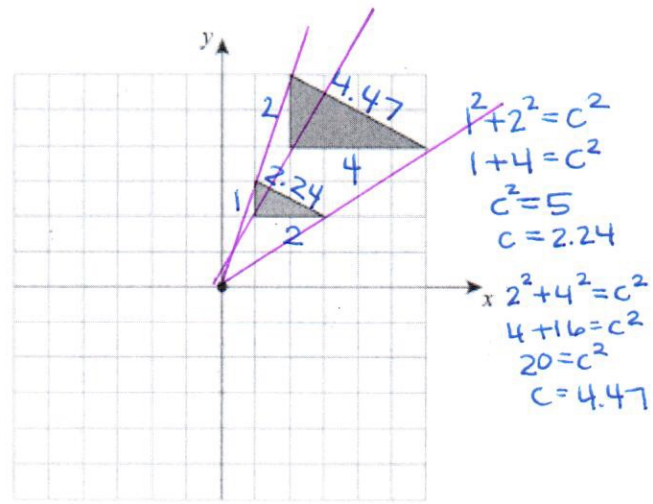
$$\frac{1}{2} = \frac{2}{4} = \frac{2.24}{4.47}, \text{ yes}$$

b) The corresponding sides are parallel

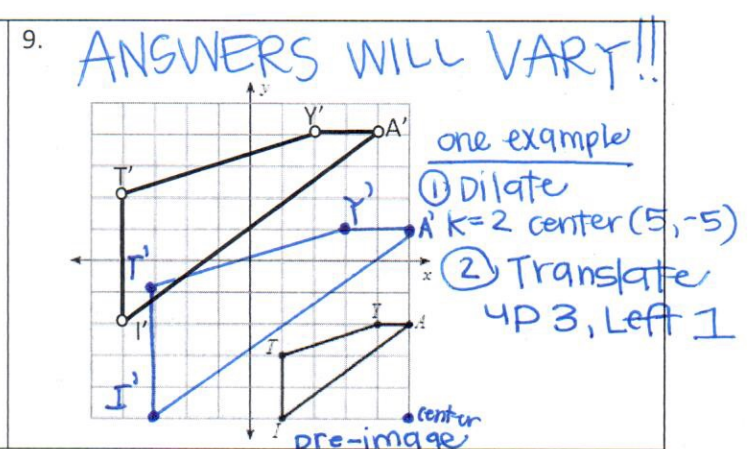
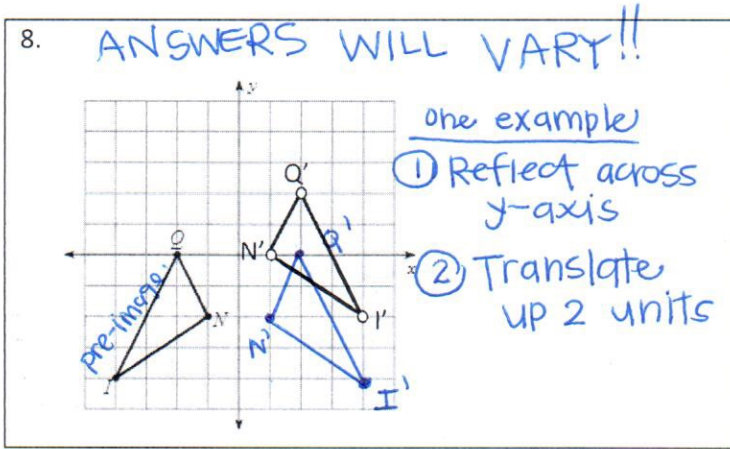
yes $m = \frac{1}{0}, \frac{2}{0}$ $m = \frac{0}{2} = \frac{0}{4}$ $m = \frac{-1}{-2} = \frac{2}{-4}$

c) The corresponding points are collinear with the center

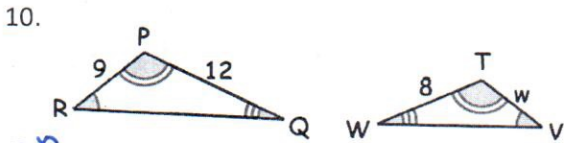
see graph



Name the transformations that map the pre-image onto the image.



Identify the similar triangles by writing a similarity statement. Find the value of each variable.

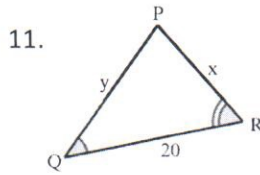


$\angle P \cong \angle T$
 $\angle R \cong \angle V$
 $\angle Q \cong \angle W$
 so
 $\Delta RPQ \sim \Delta VTW$
 by AA~

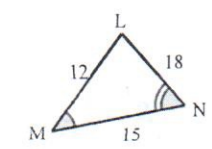
$$\frac{12}{8} = \frac{9}{w}$$

$$\frac{12w}{12} = \frac{72}{12}$$

$$w = 6$$



$\angle Q \cong \angle M$
 $\angle R \cong \angle N$
 so $\Delta PRQ \sim \Delta LNM$
 by AA~



$$\frac{20}{15} = \frac{y}{12}$$

$$15y = 240$$

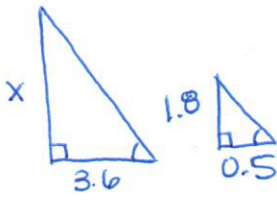
$$y = 16$$

$$\frac{20}{15} = \frac{x}{18}$$

$$15x = 360$$

$$x = 24$$

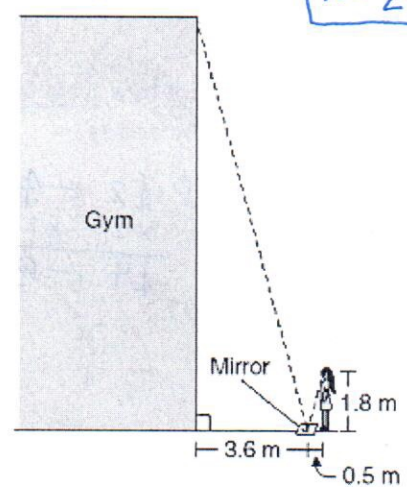
12. Nicole wants to estimate the height of her school's gym. Nicole sights the top of the gym wall in a mirror that she has placed on the ground. The mirror is 3.6 meters from the base of the gym wall. Nicole is standing 0.5 meter from the mirror and her height is about 1.8 meters. What is the height of the gym wall? (The two triangles are similar by AA~)



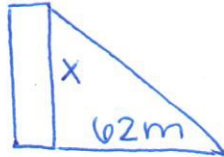
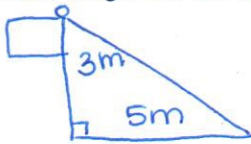
$$\frac{x}{1.8} = \frac{3.6}{0.5}$$

$$\frac{0.5x}{0.5} = \frac{6.48}{0.5}$$

$$x = 12.96m$$



13. A flagpole 3 meters tall casts a shadow 5 meters long at the same time that a building nearby casts a shadow 62 meters long. How tall is the building?



$$\frac{3}{5} = \frac{x}{62}$$

$$\frac{5x}{5} = \frac{186}{5}$$

$$x = 37.2 \text{ m}$$

Decide whether the following triangles are similar. If they are, state 1) the similarity postulate (AA~, SAS~, or SSS~) that justifies your answer and 2) the similarity statement.

14.

$\angle CAB \cong \angle KAL$
 $\angle C \cong \angle K$

$$\frac{55}{12} \stackrel{?}{=} \frac{25}{5}$$

$$4.6 \stackrel{?}{=} 5$$

by SAS~

NOT SIMILAR

15.

AA~

$\angle L \not\cong \angle C$
 $\angle B \not\cong \angle K$
 $\angle D \not\cong \angle J$

No two angles are ~

NOT SIMILAR

16.

AA~

$\angle FSE \cong \angle RSQ$

by AA~

$\triangle FSE \sim \triangle RSQ$

17.

SAS~

$\angle TSU \cong \angle CBA$

$$\frac{16}{24} \stackrel{?}{=} \frac{28}{42}$$

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

$\triangle STU \sim \triangle CBA$
by SAS~

18.

SSS~

$$\frac{18}{42} \stackrel{?}{=} \frac{27}{62} \stackrel{?}{=} \frac{31}{70}$$

$$0.43 \times 0.44 \times 0.44$$

NOT SIMILAR

19.

SSS~

$$\frac{4}{22} \stackrel{?}{=} \frac{6}{33} \stackrel{?}{=} \frac{8}{44}$$

$$0.18 \checkmark \quad 0.18 \checkmark \quad 0.18 \checkmark$$

$\triangle TVU \sim \triangle NLM$
by SSS~

Given the following right triangles, solve for the value of x.

20.

SL
hyp

$$\frac{9}{15} = \frac{15}{x}$$

$$9x = 225$$

$$x = 25$$

21.

SL
LL

$$\frac{36}{x} = \frac{x}{64}$$

$$x^2 = 2304$$

$$x = \sqrt{2304}$$

x = 48

22.

Pyth. Thm

$$z^2 + z^2 = 6^2$$

$$4 + z^2 = 36$$

$$z^2 = 32$$

$$z = 5.66$$

SL
Hyp

$$\frac{6}{x} = \frac{z}{18}$$

$$\frac{6}{x} = \frac{2}{6}$$

$$2x = 36$$

$$x = 18$$

Pyth. Thm

$$6^2 + y^2 = 18^2$$

$$36 + y^2 = 324$$

$$y^2 = 288$$

y = 16.97

23.

SL
hyp

$$\frac{4}{x} = \frac{x}{29}$$

$$x^2 = 116$$

x = 10.77