DILATIONS

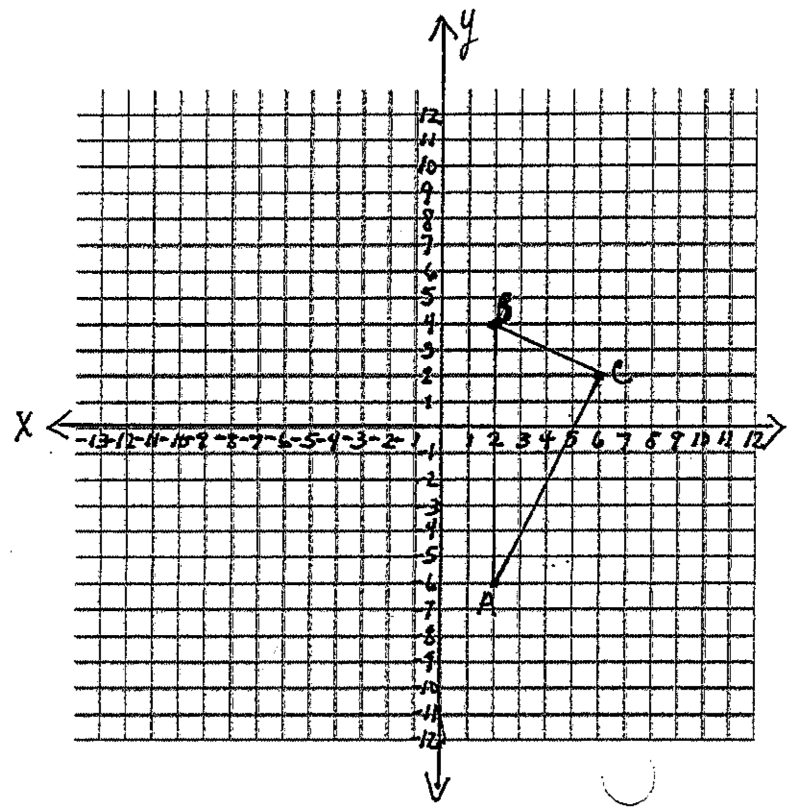
A dilation will make a shape ____________________ or ________________________

Scale Factors < 1 will make a shape _____________.   Examples:

Scale Factors > 1 will make a shape _____________.   Examples:

Scale Factors $= 1$ will keep the shape _____ _____.

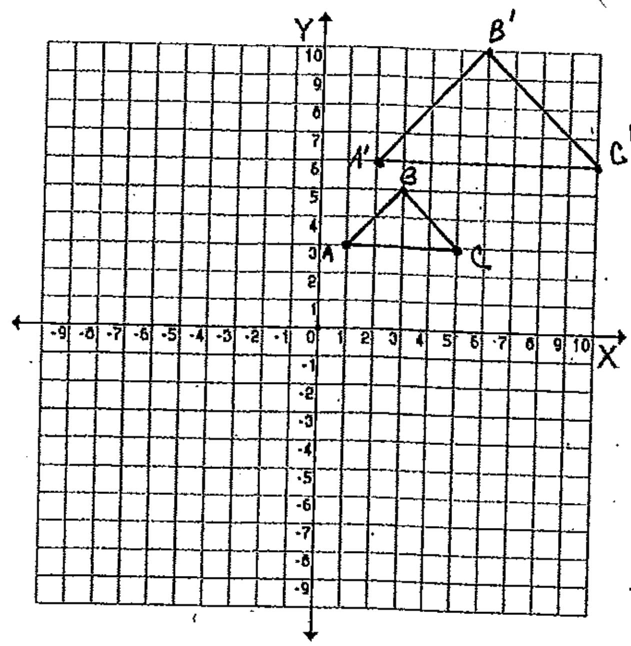
Dilate ABC with scale factor 2.   A′ (   ) B′ (   ) C′ (   )



Dilate ABC with scale factor $\frac{1}{2}$ A″ (   ) B″ (   ) C″ (   )

What happens if you are given a shape and asked to find the scale factor?

3. Look at the figures on the graph.



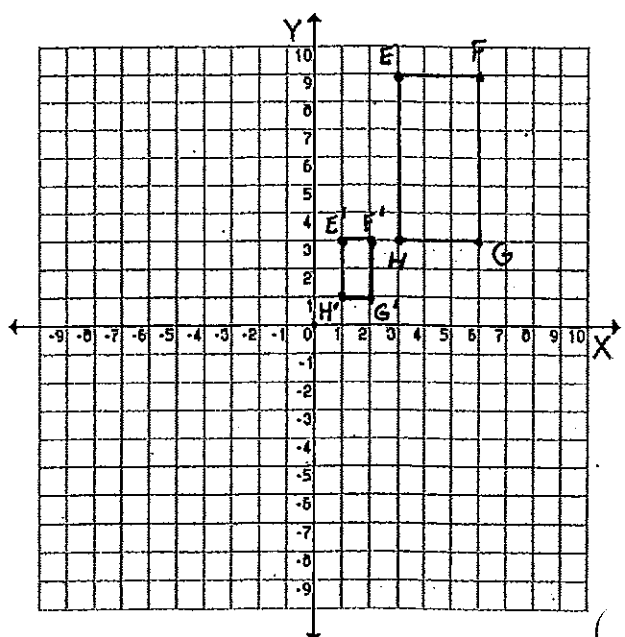
Look at the points on each one:

Original("pre-image)"	Image

How did you get from the originals to the image?____________________

That is the scale factor if it is the same for each point.

4. What scale factor was used here?

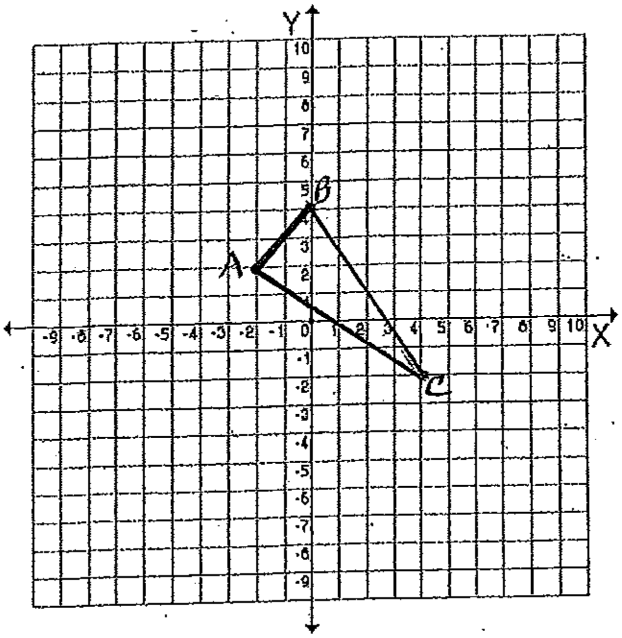


Math 8

Name: ______________________________

LATIONS Practice

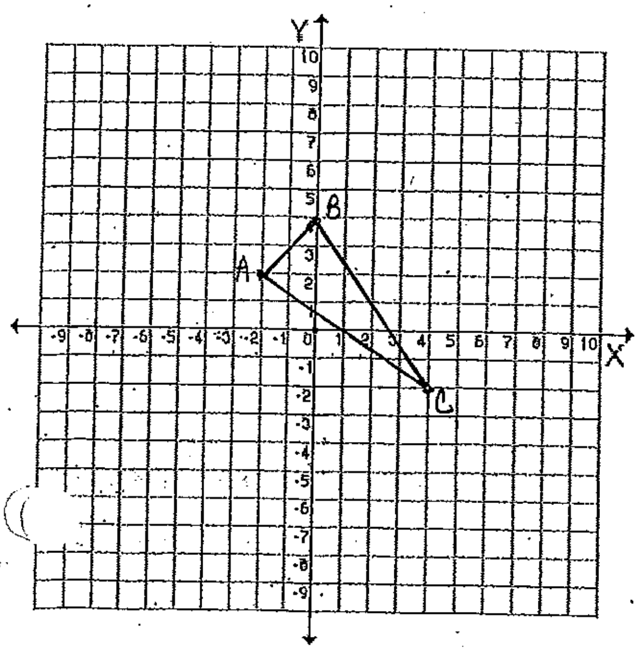
Date: ______________________________



$\Delta ABC \rightarrow$ A(-2, 2) B(0, 4) C(4, -2)

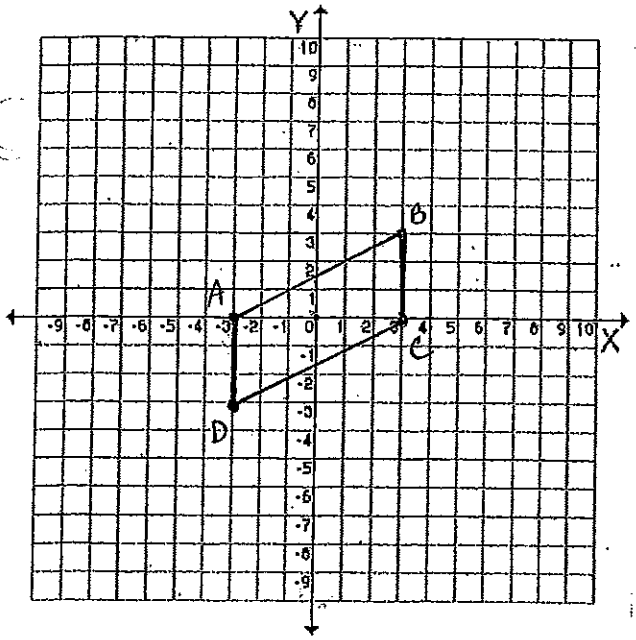
1a. Dilate ΔABC by scale factor 2.

1b. Give new coordinates for the image.



2a. Dilate ΔABC by scale factor $\frac{1}{2}$.

2b. Give new coordinates for the image.



Given ▱ABCD

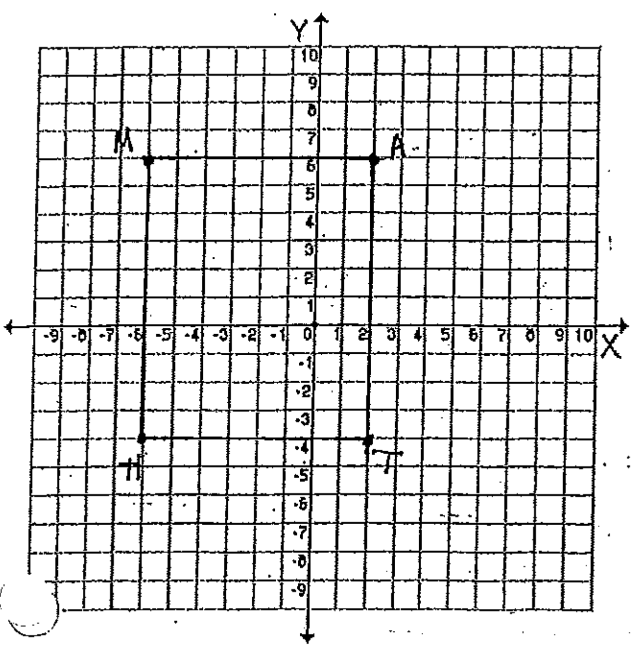
A(-3,0) B(3,3) C(3,0) D(-3,-

3a. Dilate ▱ABCD by scale factor 2.

New coordinates:

3b. Dilate ▱ABCD by scale factor 3

New coordinates:

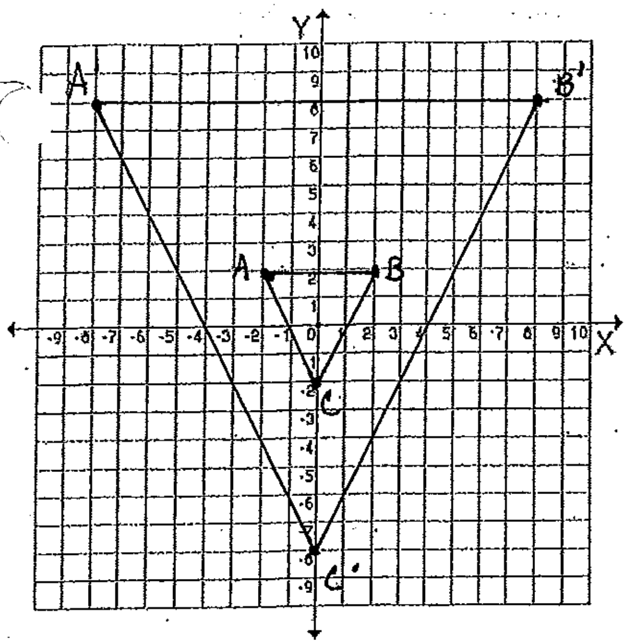


Given ▱MATH

M(-6,6) A(2,6) T(2,-4) H(-6,-4)

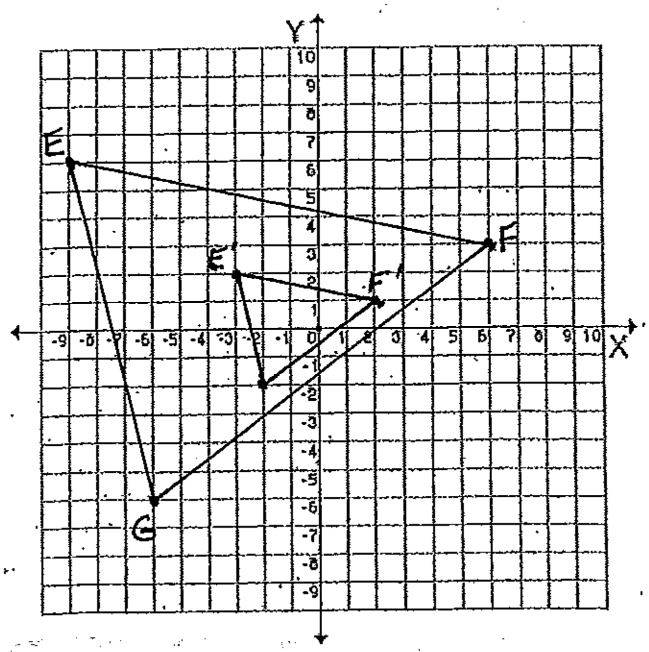
4a. Dilate ▱MATH by scale factor $\frac{1}{2}$

4b. New coordinates:



5. What scale factor has taken ΔABC to $\Delta A'B'C'$?

______ Answer



6. What scale factor has taken ΔEFG to $\Delta E'F'G'$?

______ Answer

The table below shows the coordinates of triangle RST and the coordinates of R in triangle R′S′T′. Triangle R′S′T′ is a dilation of triangle RST.

Triangle RST		Triangle R′S′T′	
R	(–2, –3)	R′	(–6, –9)
S	(0, 2)	S′	
T	(2, –3)	T′	

Hint! * What scale factor was used with R to get R′?

Part A

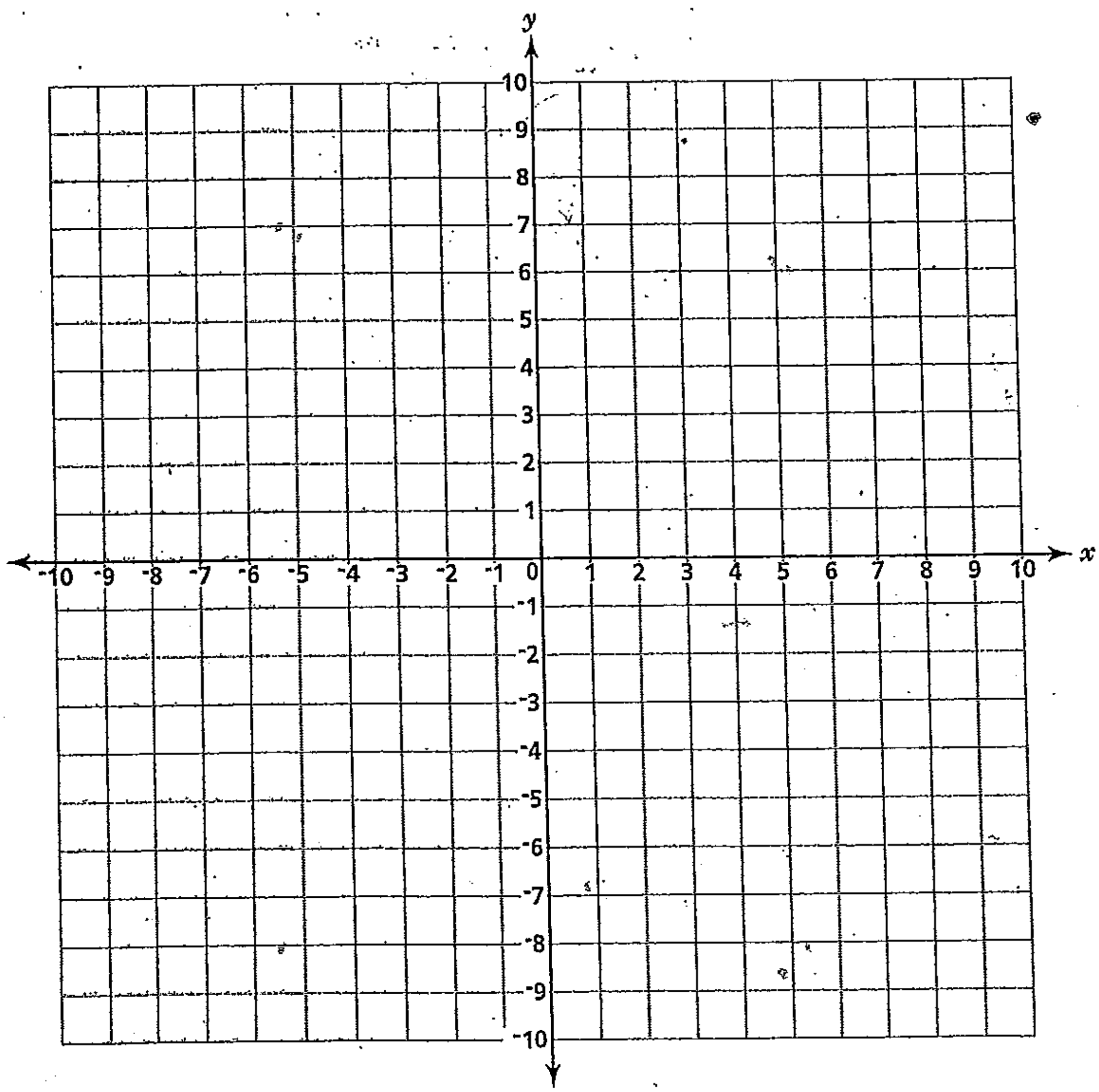
What are the coordinates of point S′ and point T′?

Answer S′ = (_____, _____)

T′ = (_____, _____)

Part B

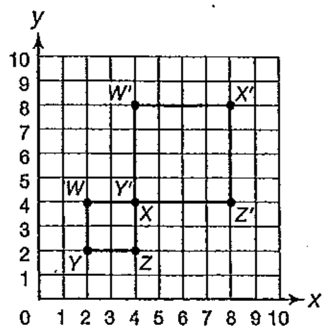
On the grid below, draw triangle RST and triangle R′S′T′.



Lesson Practice

Choose the correct answer.

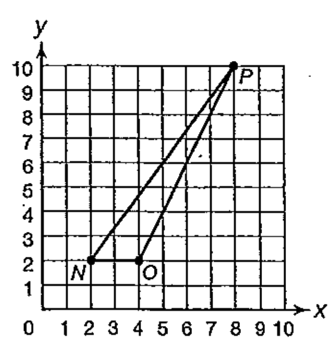
1. Rectangle $W'X'Y'Z'$ is the image of rectangle $WXYZ$ after a dilation. The center of dilation is the origin. What is the scale factor of the dilation?



A. $\frac{1}{2}$ C. 2

B. $\frac{3}{2}$ D. 4

2. Triangle NOP below will be dilated with the origin as the center of dilation and a scale factor of $\frac{1}{2}$. What will be the coordinates of the vertices of the dilated image, $\triangle N'O'P'$?



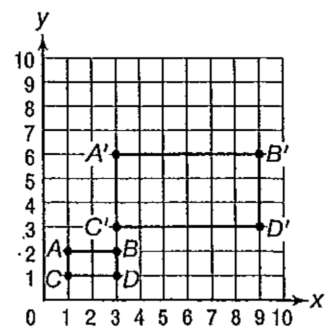
A. $N'(4, 4)$, $O'(8, 4)$, $P'(16, 20)$

B. $N'(1, 2)$, $O'(2, 2)$, $P'(4, 10)$

C. $N'(1, 1)$, $O'(2, 1)$, $P'(4, 5)$

D. $N'(1, 1)$, $O'(1, 1)$, $P'(3, 5)$

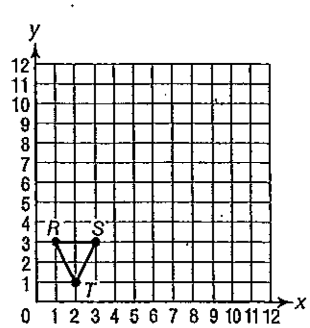
3. Rectangle $A'B'C'D'$ is the image of rectangle $ABCD$ after a dilation. The center of dilation is the origin. What is the scale factor of the dilation?



A. $\frac{1}{3}$ C. 2

B. $\frac{2}{3}$ D. 3

4. Triangle RST below will be dilated with the origin as the center of dilation and a scale factor of 4. What will be the coordinates of the vertices of the dilated image, $\triangle R'S'T'$?



A. $R'(4, 12)$, $S'(12, 12)$, $T'(8, 4)$

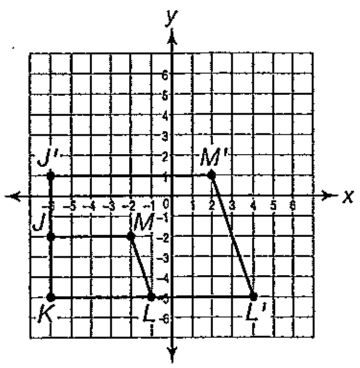
B. $R'(4, 12)$, $S'(9, 9)$, $T'(8, 1)$

C. $R'(2, 6)$, $S'(12, 12)$, $T'(4, 2)$

D. $R'\left(\frac{1}{4}, \frac{3}{4}\right)$, $S'\left(\frac{1}{2}, \frac{1}{4}\right)$, $T'\left(1, \frac{5}{4}\right)$

10

5. Quadrilateral $J'KL'M'$ is the image of quadrilateral $JKLM$ after a dilation. Point K is the center of dilation. What is the scale factor of the dilation?



A. 3

B. 2

C. $\frac{1}{2}$

D. $\frac{1}{3}$

6. Triangle ABC is dilated with a scale factor of 4 and the center of dilation is the origin. If the coordinates of the vertices of $\triangle ABC$ are $A(4, 8)$, $B(12, 8)$, and $C(16, 20)$, what are the coordinates of the vertices of the image after the dilation?

A. $A'(16, 32)$, $B'(48, 32)$, $C'(64, 80)$

B. $A'(16, 32)$, $B'(48, 8)$, $C'(48, 80)$

C. $A'(8, 12)$, $B'(16, 12)$, $C'(20, 24)$

D. $A'(1, 2)$, $B'(3, 2)$, $C'(4, 5)$

7. Triangle ABC has vertices $A(1, 6)$, $B(5, 4)$, and $C(3, 1)$. Triangle ABC will be dilated by a scale factor of 3, with the center of dilation at the origin.

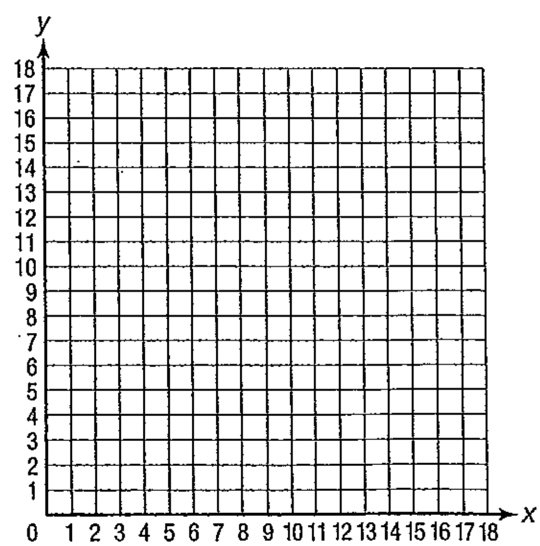
A. Find the coordinates of the vertices of the dilated image, $\triangle A'B'C'$. Show your work.

____

____

____

B. On the coordinate grid, graph $\triangle ABC$ and its image, $\triangle A'B'C'$.

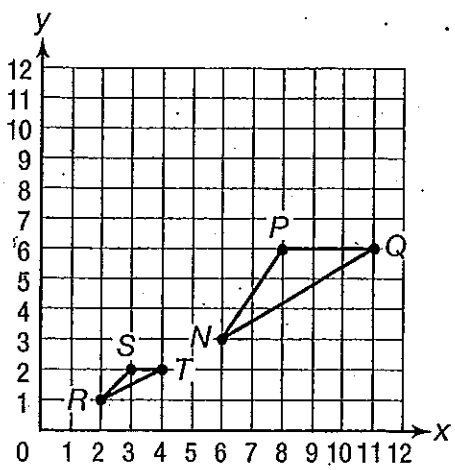


Lesson Practice

Choose the correct answer.

Use the diagram for questions 1 and 2.

Triangle RST is the result of a dilation of $\triangle NPQ$ with the center of dilation at the origin and a scale factor of $\frac{1}{3}$.

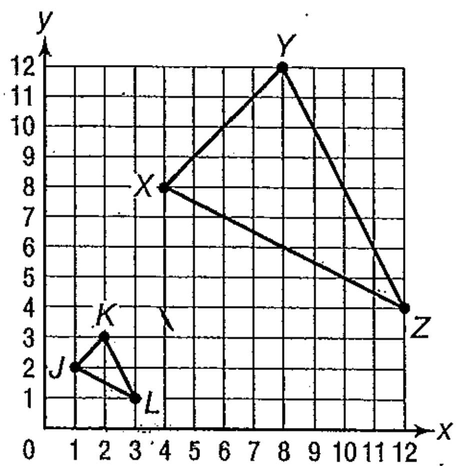


1. Which of the following must be true?
   - **A.** $\angle N$ is congruent to $\angle R$.
   - **B.** $\angle N$ is congruent to $\angle S$.
   - **C.** $\angle P$ is congruent to $\angle R$.
   - **D.** $\angle P$ is congruent to $\angle T$.

2. Which proportion must be correct?
   - **A.** $\frac{NP}{RS} = \frac{PQ}{RT}$
   - **B.** $\frac{NP}{RS} = \frac{PQ}{ST}$
   - **C.** $\frac{NP}{RT} = \frac{PQ}{ST}$
   - **D.** $\frac{NP}{RT} = \frac{NQ}{RS}$

Use the diagram for questions 3 and 4.

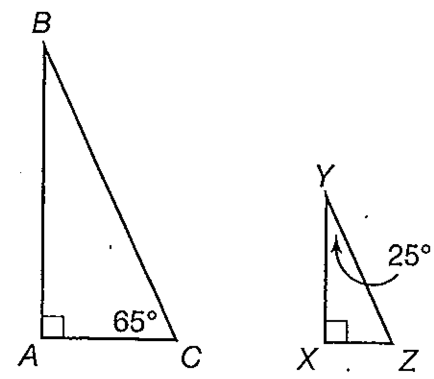
Triangle XYZ is the result of a dilation of $\triangle JKL$ with the center of dilation at the origin and a scale factor of 4.



3. Which names a pair of corresponding, congruent angles?
   - **A.** $\angle L$ and $\angle X$
   - **B.** $\angle L$ and $\angle Y$
   - **C.** $\angle K$ and $\angle X$
   - **D.** $\angle K$ and $\angle Y$

4. Which is **not** true of the triangles in the diagram?
   - **A.** $\triangle XYZ$ is similar to $\triangle JKL$ because a dilated image is similar to the original figure.
   - **B.** The ratio $\frac{JK}{XY}$ is equivalent to the ratio $\frac{KL}{YZ}$.
   - **C.** $m\angle J = m\angle X$
   - **D.** $JL = XZ$

Use the diagram for questions 5 and 6.



5. Given that $\triangle ABC$ is similar to $\triangle XYZ$, which is **not** true of these triangles?

   A. $m\angle Z = 65°$

   B. $\frac{BC}{YZ} = \frac{BA}{XZ}$

   C. $\frac{BC}{YZ} = \frac{BA}{YX}$

   D. $\frac{BC}{YZ} = \frac{AC}{XZ}$

6. Triangle ABC is similar to $\triangle XYZ$ because two pairs of corresponding angles are congruent. Which of the following is **not** true and does **not** help to prove this?

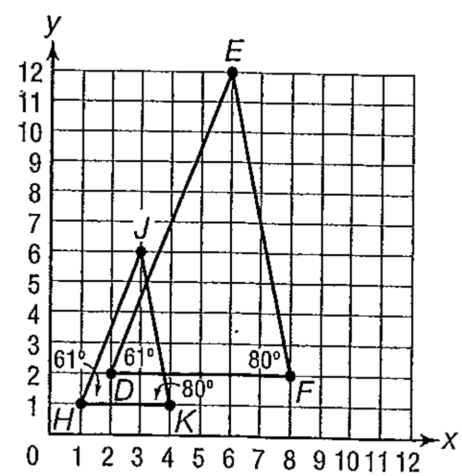
   A. The sum of the measures of $\triangle ABC$ is 180°, so $m\angle B = 25°$.

   B. $m\angle B = m\angle Y = 25°$

   C. $m\angle C = m\angle Y = 25°$

   D. $m\angle A = m\angle X = 90°$

7. Look at $\triangle HJK$ and $\triangle DEF$.



   A. Explain how you could prove that $\triangle HJK$ is similar to $\triangle DEF$.

   ____

   ____

   ____

   B. List all the pairs of corresponding, congruent angles. Then list all the ratios of corresponding, proportional side lengths for these triangles.

   ____

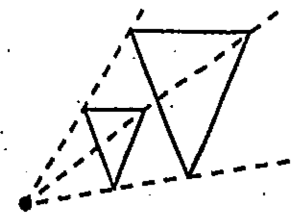
   ____

   ____

Name ______________________________ Date ______________

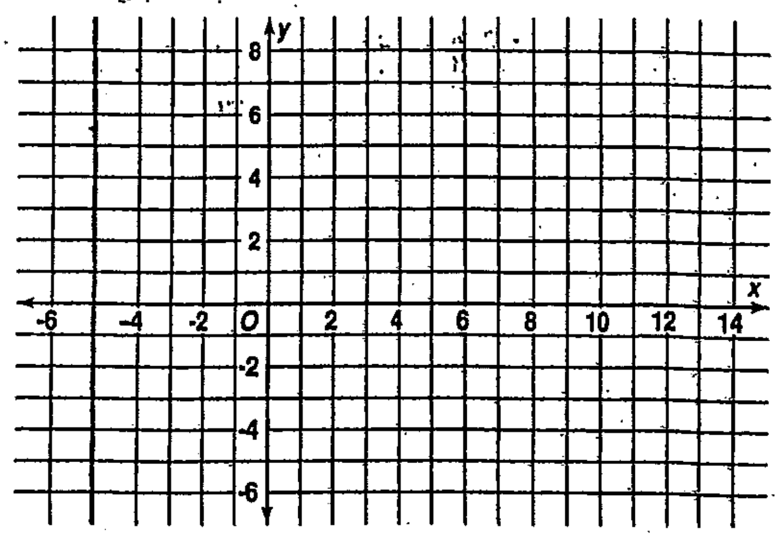
Enrichment Worksheet 9-8

Dilation and Area



A dilation of a shape creates a new shape that is similar to the original. The ratio of the new image to the original is called the *scale factor*.

Plot and draw each shape. Then perform the dilation of each shape using a scale factor of two. After the new image has been drawn, determine the area of both the original shape and its dilation.



1. △ (2, 1) (7, 1) (4, 4)

Area of original ________

Area of dilation ________

○ with radius (1, 2) to (4, 2)

Area of original ________

Area of dilation ________

3. ▭ (-3, 2), (-3, -2), (4, -2), (4, 2)

Area of original ________

Area of dilation ________

4. □ (-3, 3), (-3, -3), (3, -3), (3, 3)

Area of original ________

Area of dilation ________

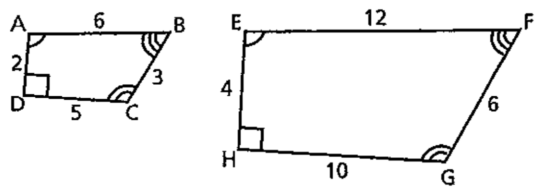
5. What general statement can be made about the area of a figure when compared to its area after being dilated by scale factor 2?

14

Name ______________________________ Date ____________

Similarity

Polygons are **similar** if they are the same shape, but not necessarily the same size. The symbol to show that two polygons are similar is ~.



Same shape means the corresponding angles are congruent. The lengths of the corresponding sides are proportional.

To check proportions, set up corresponding segments as a ratio:

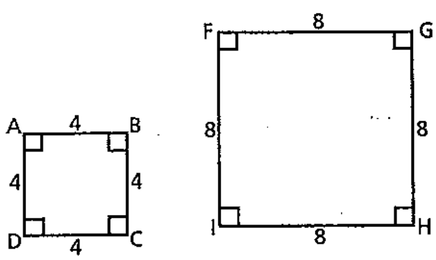
$\frac{AB}{EF} = \frac{6}{12}$ $\frac{BC}{FG} = \frac{3}{6}$ $\frac{CD}{GH} = \frac{5}{10}$ $\frac{AD}{EH} = \frac{2}{4}$

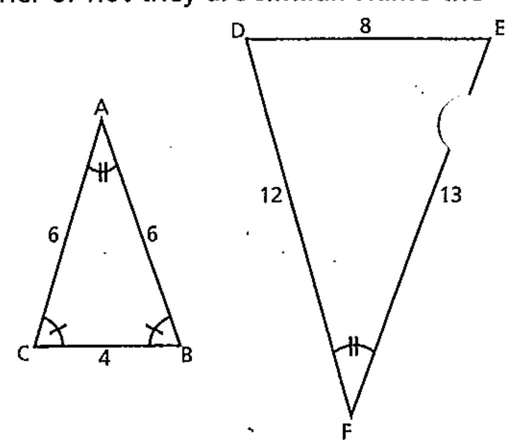
If these ratios are equivalent, then the polygons are proportional.

$\frac{6}{12} = \frac{1}{2}$ $\frac{3}{6} = \frac{1}{2}$ $\frac{5}{10} = \frac{1}{2}$ $\frac{2}{4} = \frac{1}{2}$

Polygon ABCD ~ polygon EFGH

For each pair of polygons, determine the ratios. Prove whether or not they are similar. Name the similar polygons.





1 Ratios of sides:

2 Are the polygons similar?

____

3 ____________ ~ ____________

4 Ratios of sides:

5 Are the polygons similar?

____

6 ______________________