

What Are Dilations?

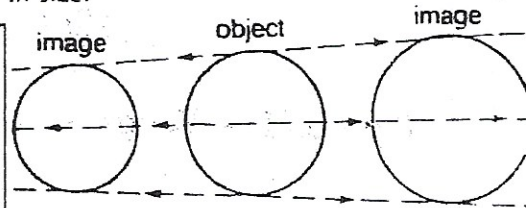
- A _____ is a change in size. The image is similar but **not congruent** to the original object.

For a dilation centered at the origin with scale factor k , the image of point $P(x, y)$ is found by multiplying each coordinate by k .

$$(x, y) \rightarrow (kx, ky)$$

- If $k > 1$, then the image is larger than the preimage.
- If $0 < k < 1$, then the image is smaller than the preimage.

A figure can be dilated, or changed in size.



Think of a zoom lens on a camera. The image can be made larger or smaller.

Example 1

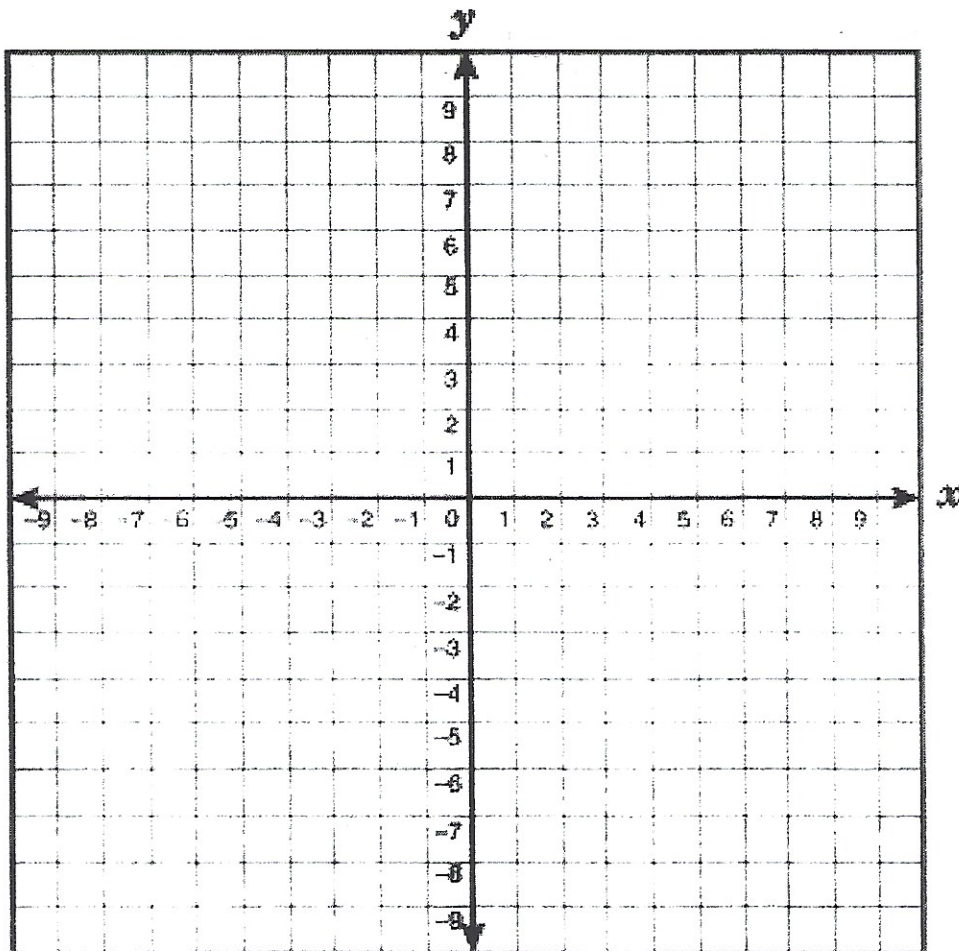
ΔABC has vertices $A(2, 2)$, $B(4, 2)$, and $C(2, 4)$

- Graph ΔABC .
- Graph $\Delta A'B'C'$ the image of ΔABC after a dilation of $k = 2$

$A'(\underline{\quad}, \underline{\quad})$ $B'(\underline{\quad}, \underline{\quad})$ $C'(\underline{\quad}, \underline{\quad})$

- Graph $\Delta A''B''C''$ the image of ΔABC after a dilation of $k = \frac{1}{2}$

$A''(\underline{\quad}, \underline{\quad})$ $B''(\underline{\quad}, \underline{\quad})$ $C''(\underline{\quad}, \underline{\quad})$



2)

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'	

Part A

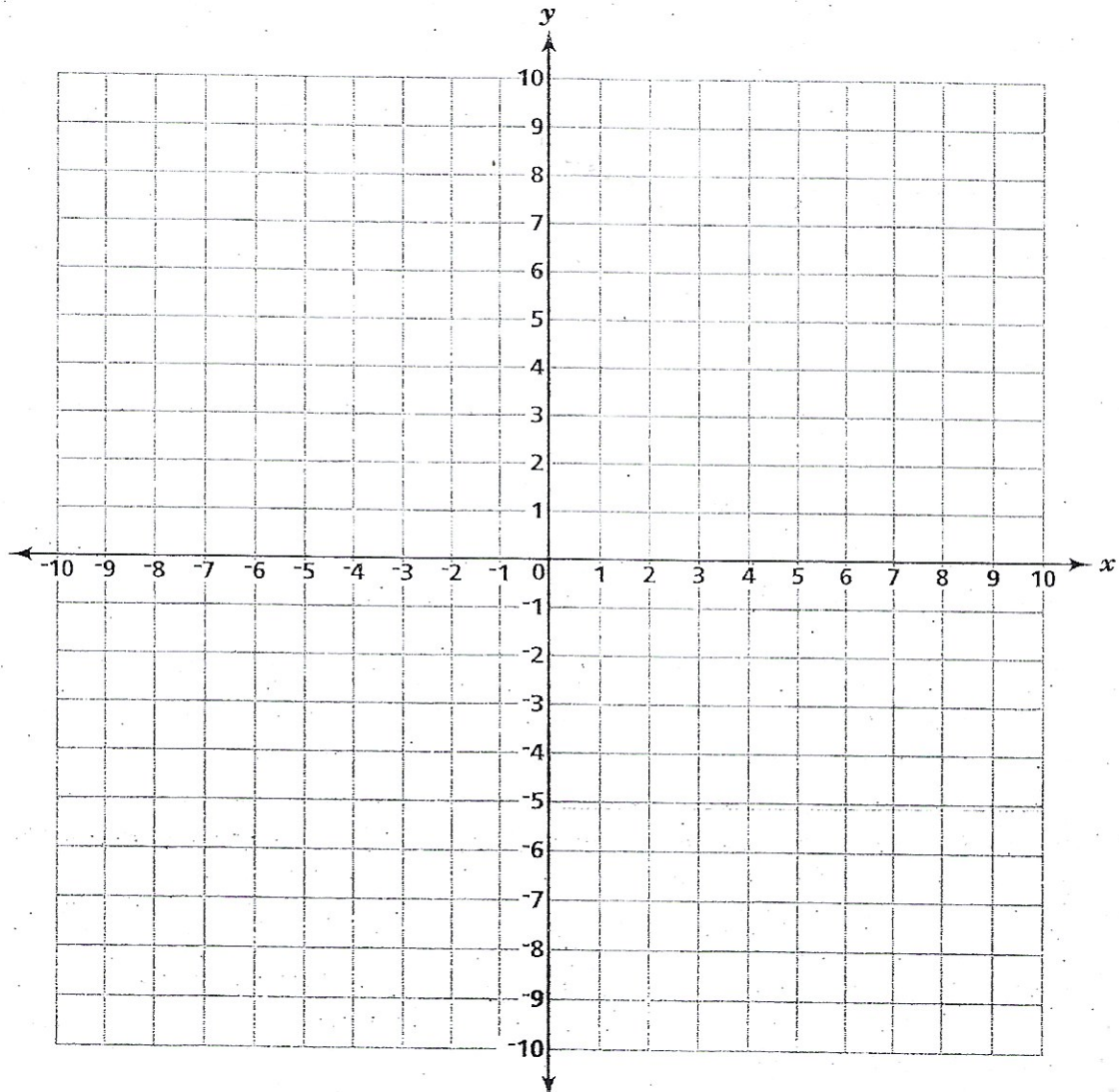
What are the coordinates of point S' and point T'?

Answer $S' = (\underline{\quad}, \underline{\quad})$

$T' = (\underline{\quad}, \underline{\quad})$

Part B

On the grid below, draw triangle RST and triangle R'S'T'.



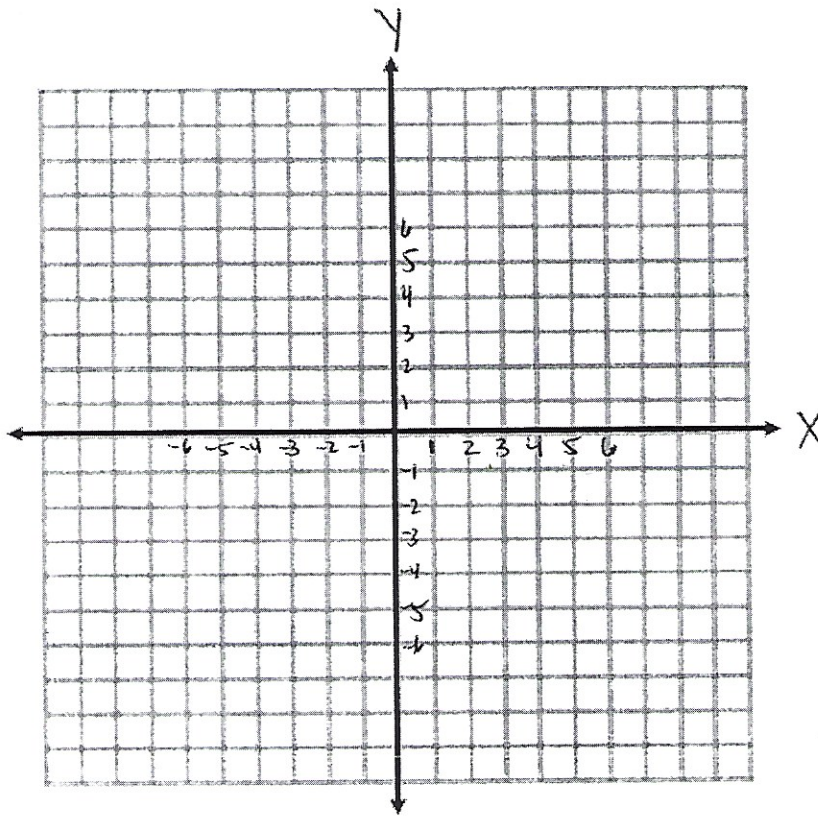
3)

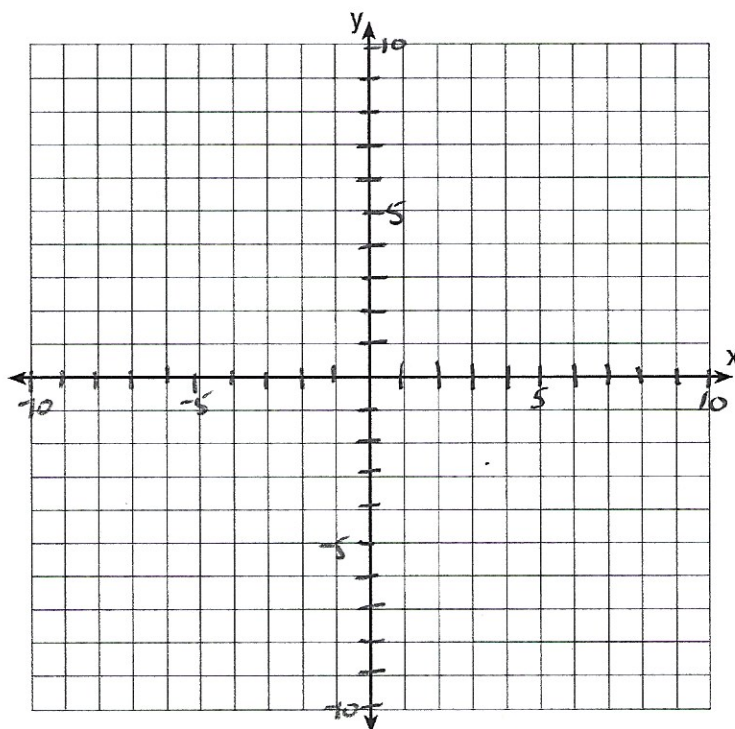
a) Graph triangle RST whose vertices are
R(1,1) S(3,1) and T(2,3)

b) Graph the image of triangle RST after a dilation of $(x, y) \rightarrow (2x, 2y)$

c) Write the coordinates of the image of triangle RST.

R' _____ S' _____ T' _____





$A'(\quad, \quad)$ $B'(\quad, \quad)$ $C'(\quad, \quad)$

④ The vertices of $\triangle ABC$ are $A(-3, -2)$, $B(2, 3)$, and $C(2, -2)$.

(a) On graph paper, draw and label $\triangle ABC$.

(b) Graph and state the coordinates of $\triangle A'B'C'$, the image of $\triangle ABC$ after a dilation of $(x, y) \rightarrow (3x, 3y)$.

(c) Explain how you determined the coordinates of C' .

Part I's

1) If point $R'(6,3)$ is the image of point $R(2,1)$ under a dilation with respect to the origin, what is the constant of the dilation?

- A) 2 C) 1
B) 3 D) 6

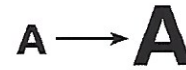
2) Under a dilation with respect to the origin, the image of $A(1,2)$ is $A'(5,10)$. Under the same dilation, what are the coordinates of B' , the image of $B(0,-3)$?

3) Under a dilation with constant of dilation k , the image of the point $(2,3)$ is $(8,12)$. What is the value of k ?

4) Under what type of transformation is size *not* preserved?

- A) rotation C) reflection
B) translation D) dilation

5) What type of transformation is represented by the illustration?



- A) reflection C) translation
B) dilation D) rotation

6) Find the image of $(3,-2)$ under the dilation D_2 .

7) The *best* description of a dilation of a figure is

- A) a turning of the figure about some fixed point
B) a slide of the figure
C) an enlargement or a reduction of the figure
D) a mirror image of the figure