Name key
Date

What Are Dilations?

same shape diff size

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

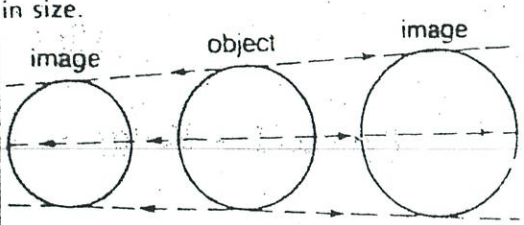
P# D/C K=

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

$\triangle ABC$ has vertices A(2, 2), B(4, 2), and C(2,4)

·½ ·½ ·½ ·½ ·½ ·½

·2 ·2 ·2 ·2 ·2 ·2

(a) Graph $\triangle ABC$.

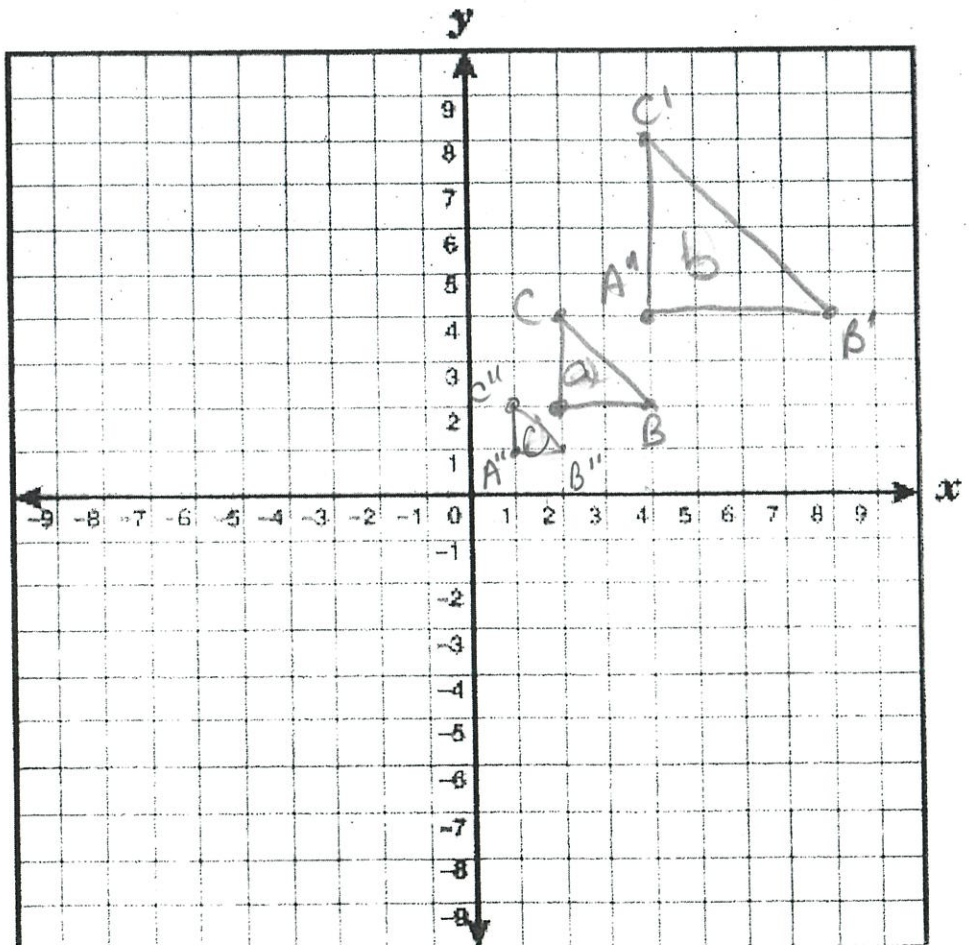
(b) Graph $\triangle A'B'C'$ the image of $\triangle ABC$ after a dilation of k = 2 scale factor

Enlargement multiply by 2

A' (4, 4) B' (8, 4) C' (4, 8)

Reduction (c) Graph $\triangle A''B''C''$ the image of $\triangle ABC$ after a dilation of $k = \frac{1}{2}$ scale factor

A'' (1, 1) B'' (2, 1) C'' (1, 2) multiply by $\frac{1}{2}$



a) in triangle R'S'T'. Triangle R'S'T' is a dilation of triangle RST.

multiply

Scale factor is 3.

Triangle RST		Triangle R'S'T'	
R	(–2, –3) X3	R'	(–6, –9)
S	(0, 2) X3	S'	(0, 6)
T	(2, –3) X3	T'	(6, –9)

*multiply by 3

Part A

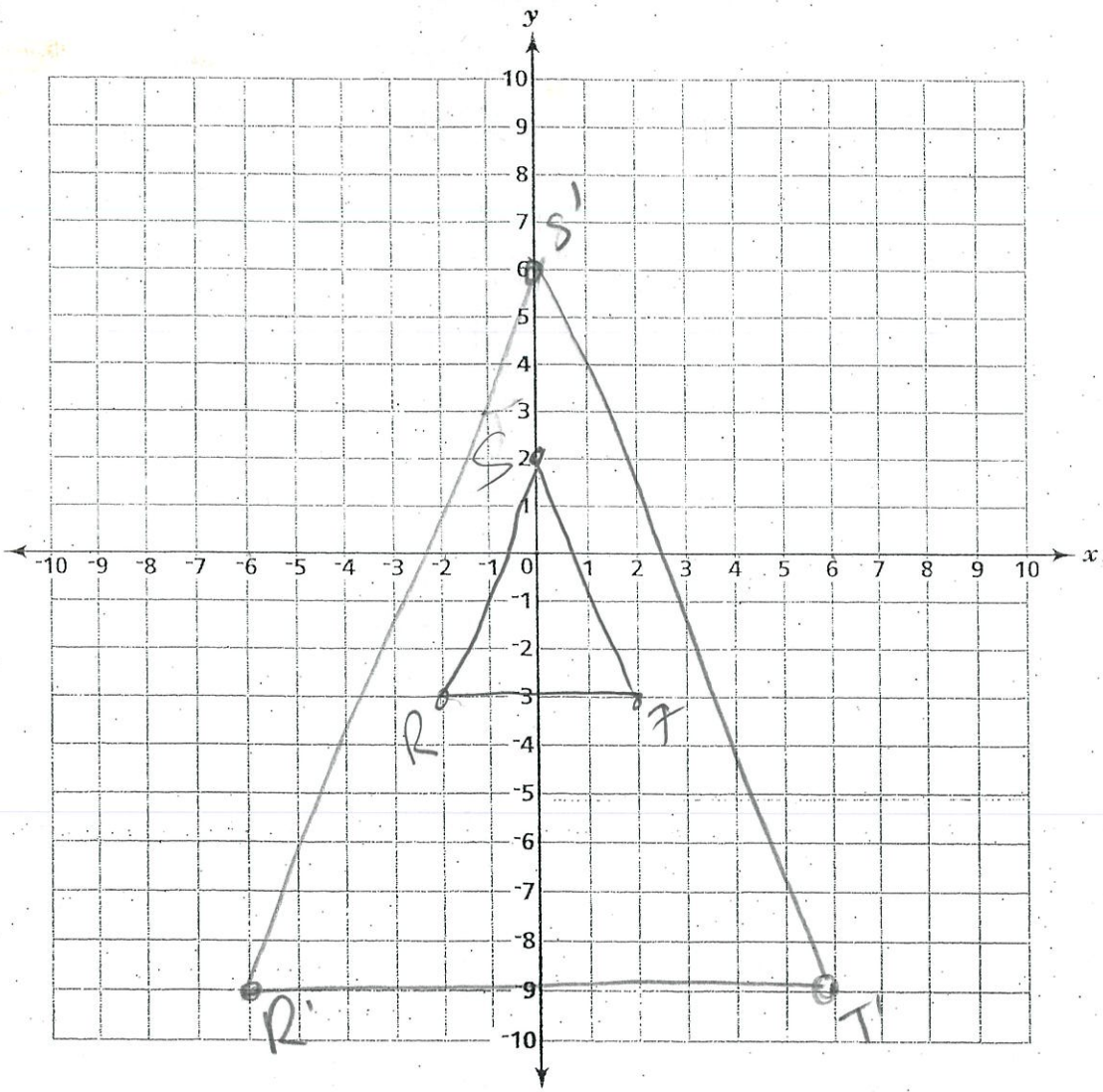
What are the coordinates of point S' and point T'?

Answer S' = (0, 6)

T' = (6, -9)

Part B

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



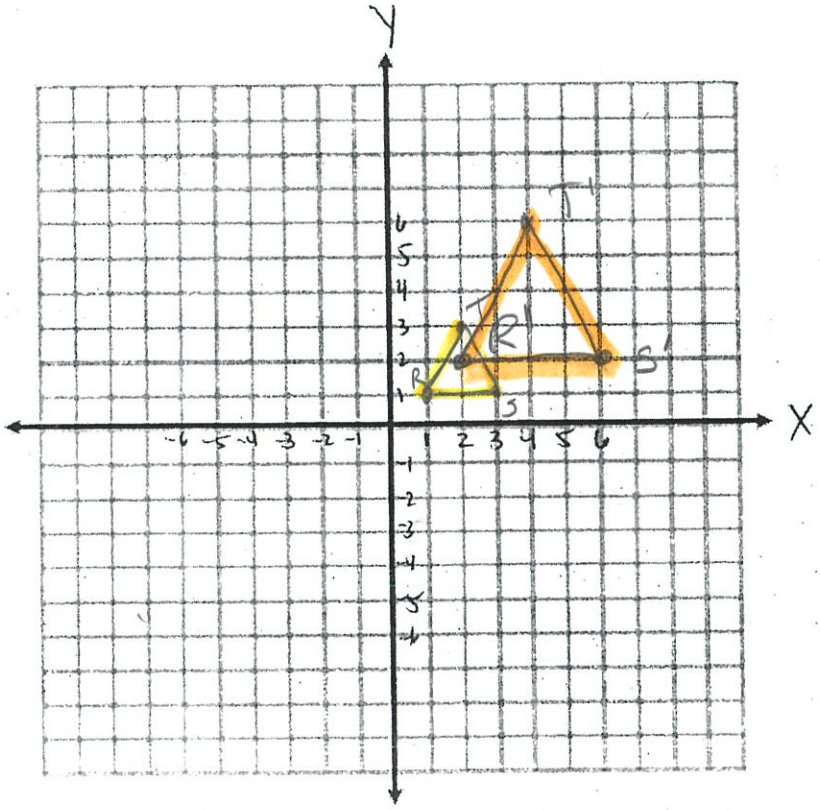
3) a) Graph triangle RST whose vertices are R(1,1) S(3,1) and T(2,3)

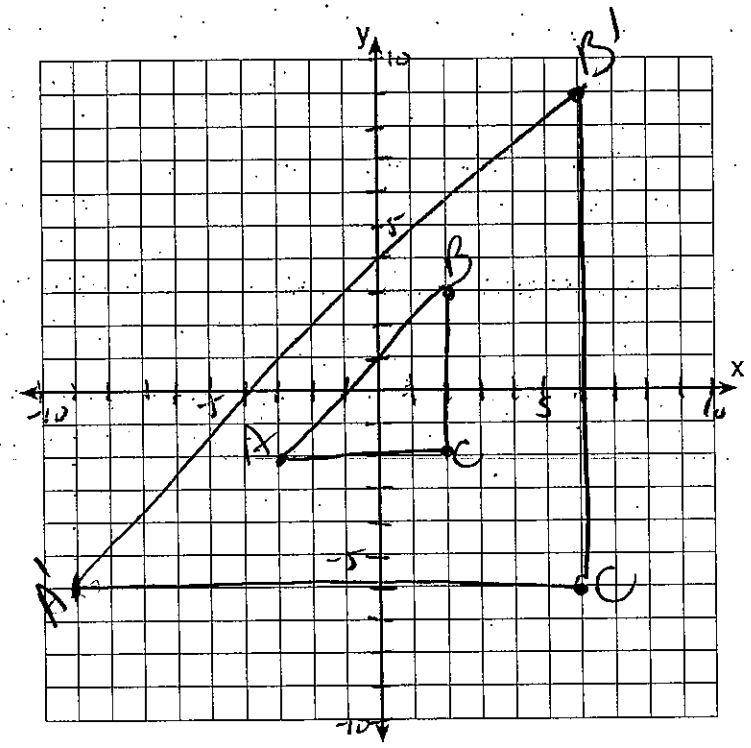
b) Graph the image of triangle RST after a dilation of $(x, y) \rightarrow (2x, 2y)$ (multiply)

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

R' (2, 2) S' (6, 2) T' (4, 6)

* Scale factor is 2.
* multiply by 2





A'(-9,-6) B'(6,9) C'(6,-6)

(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'.

I multiplied C(2,-2) by the scale factor of 3 to get C'(6,-6)

* scale factor is 3
* multiply by 3

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
B) 3
C) 1
D) 6

k

scale factor (what you multiply by)

R(2,1) → R'(6,3)
×3 ×3

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)?

A(1,2) → A'(5,10)
·5 ·5

scale factor = 5 (D_5)

B(0,-3) → B'(0,-15)
·5 ·5

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

scale factor multiply by 4

$k = 4$

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

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

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

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

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

×2 ×2

scale factor of 2

multiply by 2

(6, -4)

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