Dilations

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Definitions:

A **dilation** is a type of transformation where the image is the same shape as the pre-image but not same size.
The orientation of the image is the same as the original figure.

Isometry? Nope!

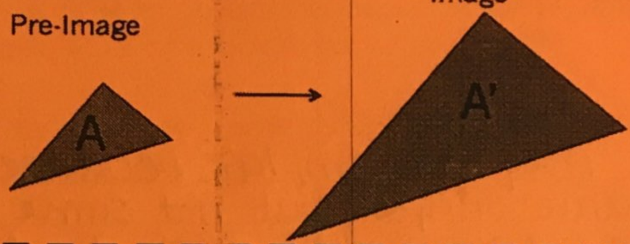
Angles are congruent.

Sides are proportional.

Figures are similar.

Fold along solid line

Scale factor: The number you multiply by to create a larger/smaller image.



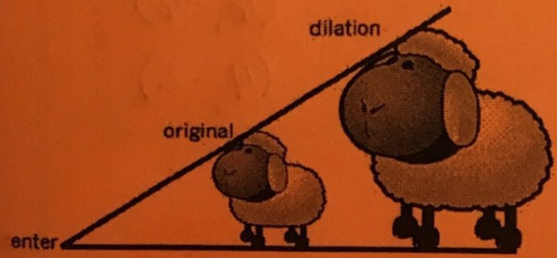
	dilation by a scale factor k
(x,y)	$K(x,y)$ or (Kx, Ky)

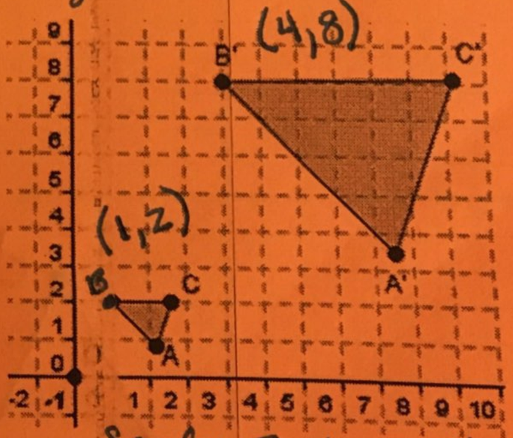
Rule: Multiply!

If k is a whole number >1, the image is larger.

If k is a fraction < 1, the image is smaller

Examples:

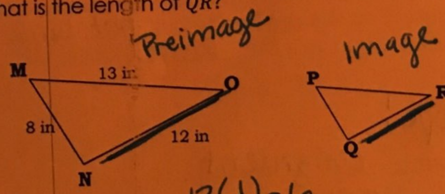




Scale Factor $\frac{4}{1} = 4$

Example 1

Part A. Triangle MNO was dilated by a scale factor of $\frac{1}{2}$ to form triangle PQR. What is the length of $\overline{QR}$?



$12(\frac{1}{2}) = 6$

Answer: $\overline{QR}$ = 6in

Part B. What side corresponds to of $\overline{MO}$? **Answer:** PR
What angle corresponds to ∠O? **Answer:** ∠R

Part C. Are these figures similar or congruent? Explain.

They are similar because they are the same shape, but not same size. ΔMNO has corresponding parts to ΔPQR

Example 2

Triangle HJK has coordinates: H(4, 8), J(-6, 4), and K(0, -8). Triangle HJK is dilated by a scale factor of −2. Write the new coordinates as H'J'K'.

D_{-2}

H(4,8) → H' $(4 \cdot -2, 8 \cdot -2) = (-8, -16)$

J(-6,4) → J' (12, -8)

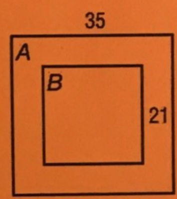
K(0,-8) → K' (0, 16)

Example 3

Square A is similar to square B. What scale factor was used to dilate square A to square B?

A $\frac{1}{7}$ C $\frac{5}{3}$

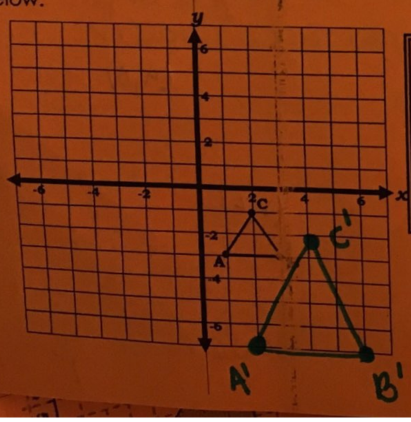
B $\frac{3}{5}$ D 7



$\frac{21 \div 7}{35 \div 7} = \boxed{\frac{3}{5}}$

Example 4

Dilate triangle ABC, with vertices A(1, -3), B(3, -3), and C(2, -1) with a scale factor of 2. Then write the new coordinates as A'B'C' in the table below.



D_2

A(1, -3) → A' (2, -6)

B(3, -3) → B' (6, -6)

C(2, -1) → C' (4, -2)

Example 5

Dilate rectangle BRAT, with vertices B(-6, 6), R(3, 6), A(3 3), and T(-6, 3) with a scale factor of $\frac{1}{3}$. Then write the new coordinates.

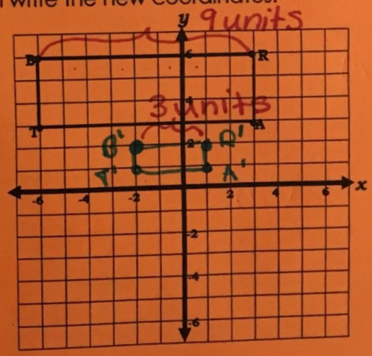
$D_{\frac{1}{3}}$

B(-6, 6) → B' (-2, 2)

R(3, 6) → R' (1, 2)

A(3, 3) → A' (1, 1)

T(-6, 3) → T' (-2, 1)



On your own:

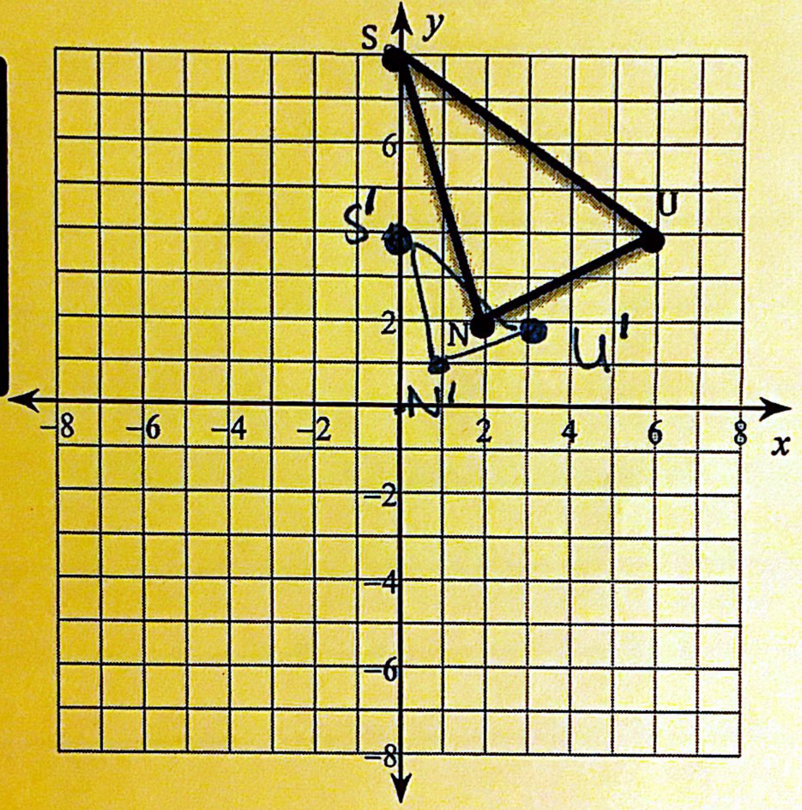
Example 6

Dilate triangle SUN with a scale factor of 0.5. Then write the new coordinates as S'U'N' in the table below.

S' (0,4)

U' (3,2)

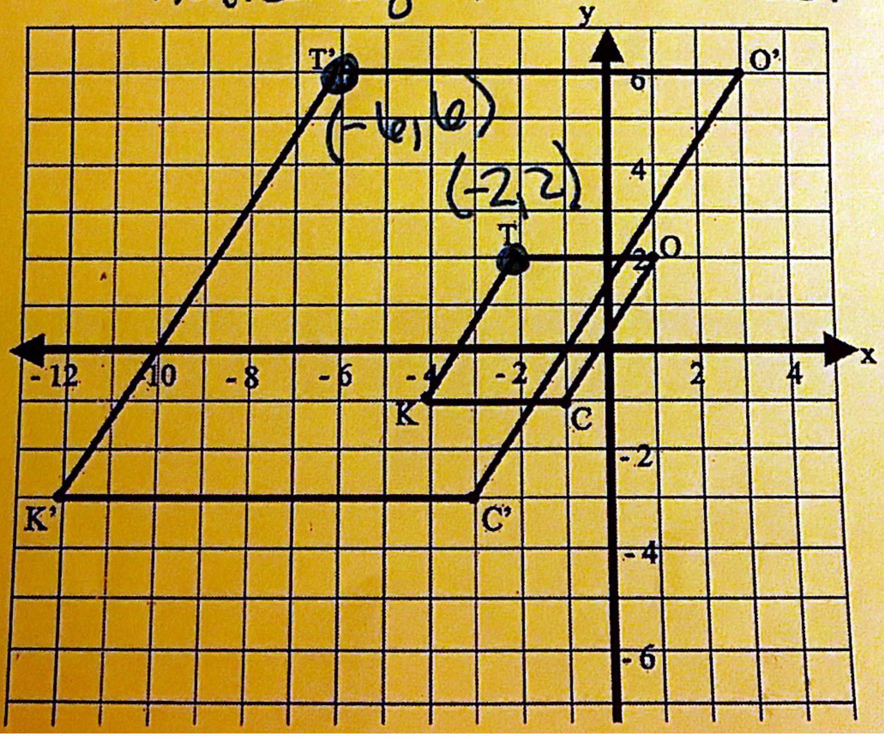
N' (1,1)



Example 7

Describe the transformation shown in the graph below.

Dilated by a scale factor of 3.



$\frac{-6}{-2} = 3$