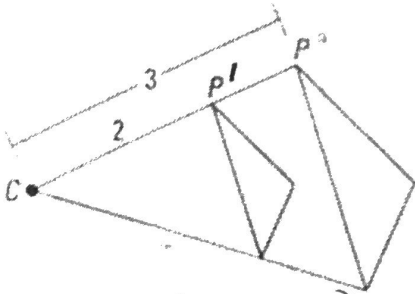


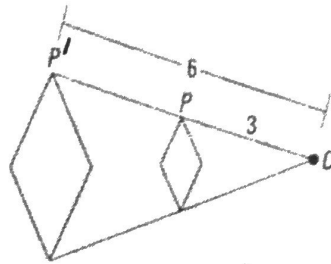
EXAMPLE A: Find the scale factor of the dilation. Then tell whether the dilation is a reduction or enlargement.

i.



(smaller)
Reduction by $\frac{2}{3}$

ii.



(larger)
Enlargement $\frac{6}{3} = 2$

EXAMPLE B: Do dilated figures create congruent figures? Explain.

No Sides are not the same measure.
They are proportional

Learning Task: Dilations in the Coordinate Plane

Part 1: Dilating from a point that is the origin

1. Dilate the following rectangle by a scale factor of $\frac{1}{2}$ centered at the origin. Write the coordinates of A' , B' , C' and D' . Is the image a reduction or enlargement?

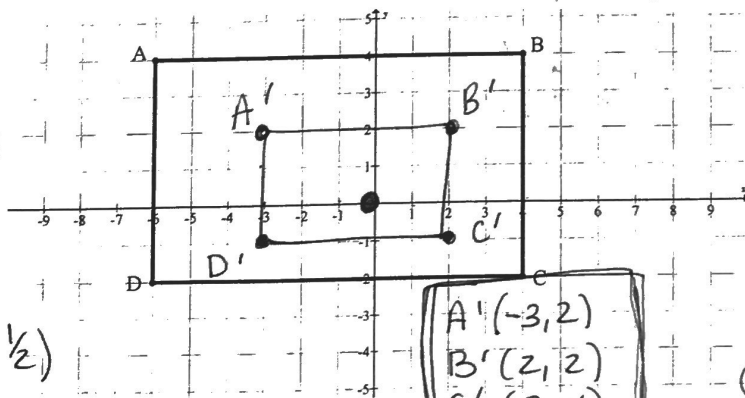
$A(-6, 4)$
Left 6, Up 4 ($\times \frac{1}{2}$)

$A'(-3, 2)$

$B(4, 4)$
Right 4, up 4 ($\times \frac{1}{2}$)

$B'(2, 2)$

$C(4, -2)$
(Right 4, Down 2) ($\times \frac{1}{2}$)
 $C'(2, -1)$



$K = \frac{1}{2}$

$\frac{1}{2} < 1$
Reduction

① Movement ~~FROM~~ Center of Dilation

② Mult. by K

③ New Movement²⁷

$D(-6, -2)$
(left 6, down 2) ($\times \frac{1}{2}$)
 $D'(-3, -1)$

Part 2: Dilating from a point that is NOT the origin

2. In the example below, we are using the point (1,2) as the center of the dilation. $\triangle ABC$ has coordinates A(2, 3), B(4,3) and C(4,6). Find the coordinates dilated with a scale factor of 3. Is the image a reduction or enlargement?

$K=3$

A R1 U1 ($\times 3$)

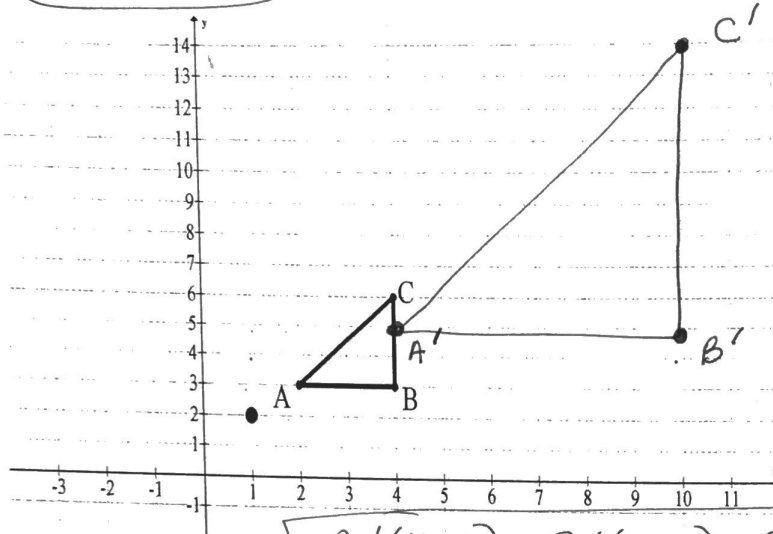
A' R3 U3

B R3 U1 ($\times 3$)

B' R9 U3

C R3 U4 ($\times 3$)

C' R9 U12



$A'(4, 5) \quad B'(10, 5) \quad C'(10, 14)$

3. In the example below, we are using the point (-2,-3) as the center of the dilation. $\triangle ABC$ has coordinates A(1, 3), B(4,3) and C(4,6). Find the coordinates dilated with a scale factor of $\frac{1}{3}$. Is the image a reduction or enlargement?

A U6 R3 ($\times \frac{1}{3}$)

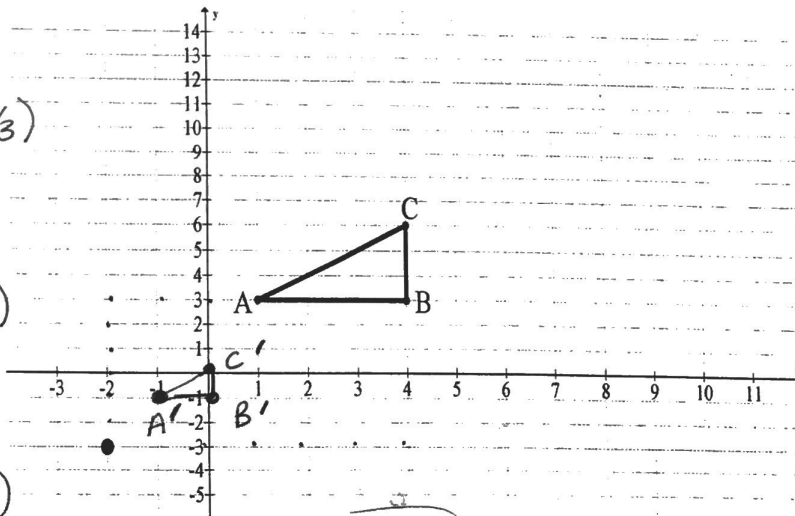
A' U2 R1

B U6 R6 ($\times \frac{1}{3}$)

B' U2 R2

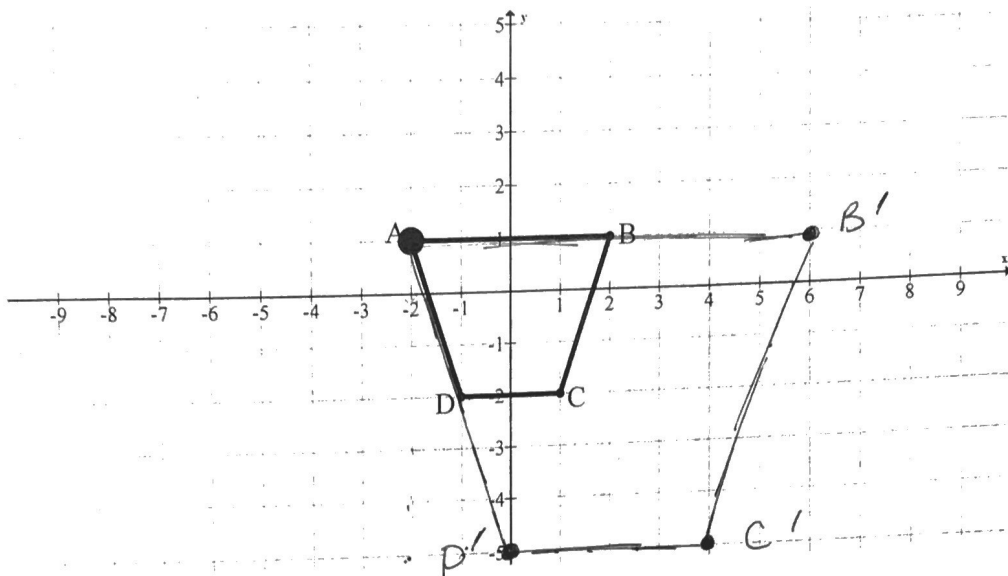
C U9 R6 ($\times \frac{1}{3}$)

C' U3 R2



$A'(-1, -1)$
 $B'(0, -1)$
 $C'(0, 0)$

4. In the example below, we are using the point $(-2,1)$ as the center of the dilation. Trapezoid ABCD has coordinates $A(-2,1)$, $B(2,1)$, $C(1,-2)$ and $D(-1,-2)$. Find the coordinates dilated with a scale factor of 2. Is the image a reduction or enlargement?



$$A (0, 0)$$

$$\boxed{A'(-2, 1)}$$

$$B (0, 4) \times 2$$

$$\frac{0 \quad 8}{\boxed{B'(6, 1)}}$$

$$C (3, 3) \times 2$$

$$D_6, R_6$$

$$\boxed{C'(4, -5)}$$

$$D (3, 1) \times 2$$

$$D_6 R_2$$

$$\boxed{D'(0, -5)}$$

Part 3: Finding the Scale Factor and Center of Dilation

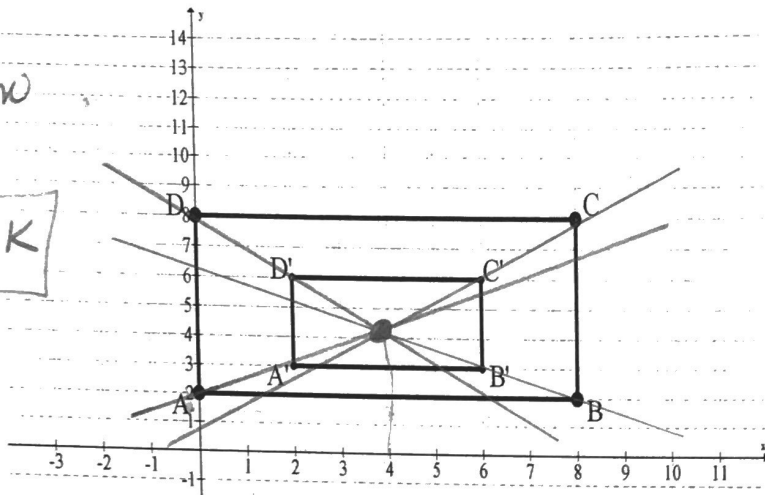
5. In the figure below, rectangle $A'B'C'D'$ is a dilation of rectangle $ABCD$.

- Determine the center of dilation. Draw lines through the corresponding vertices until you find the point where all of the lines meet.
- Determine the scale factor of the dilation. State if the dilation is an enlargement or reduction.

smaller

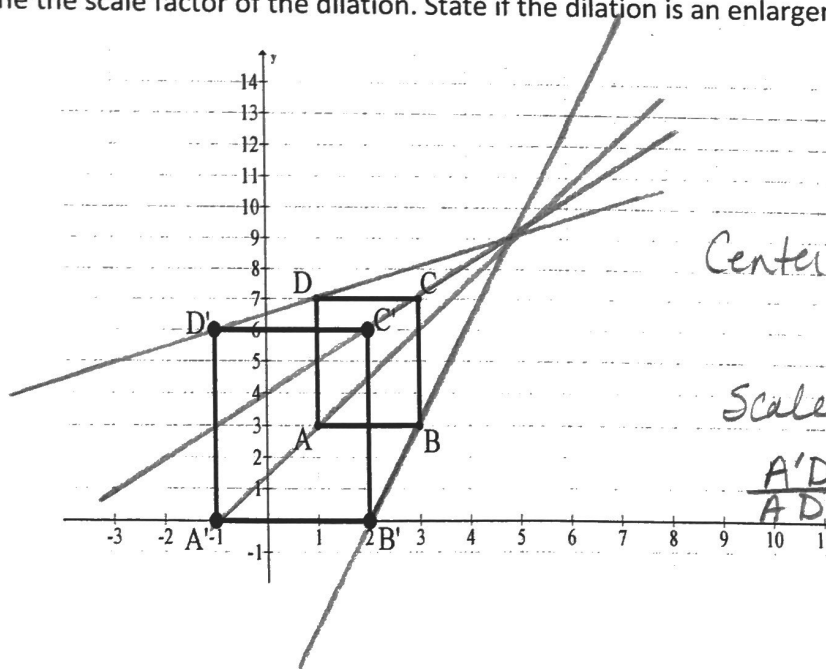
a) Center of Dilation
(4, 4)

b) $\frac{A'B'}{AB} = \frac{4}{8} = \frac{1}{2} = K$



6. In the figure below, rectangle $A'B'C'D'$ is a dilation of rectangle $ABCD$.

- Determine the center of dilation. Draw lines through the vertices until you find the point where all of the lines meet. (Note: Use the slope between each corresponding vertex to find points on the line.)
- Determine the scale factor of the dilation. State if the dilation is an enlargement or reduction.



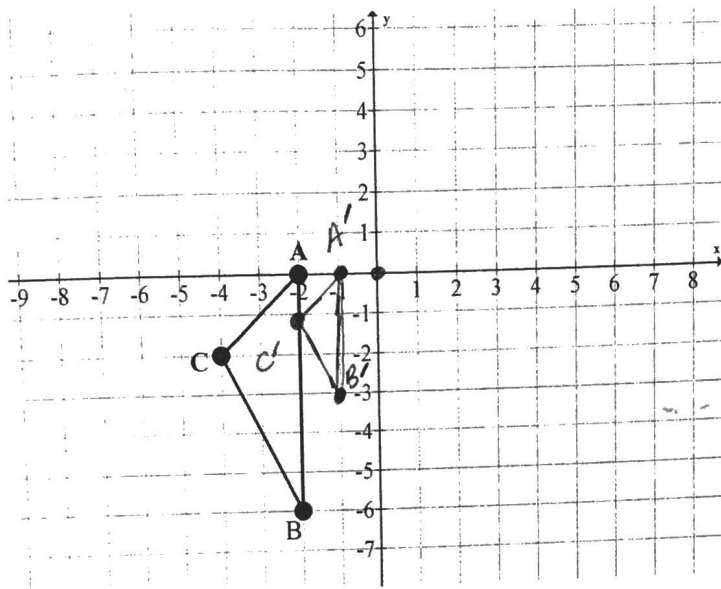
Center of Dilation
(6, 10)

Scale Factor (Larger)

$\frac{A'D'}{AD} = \frac{6}{4} = \frac{3}{2} = K$

Skills Practice: Dilations

1. Find the coordinates of the vertices of the figure after a dilation of $k = \frac{1}{2}$ centered at the origin and graph the image.



$$A(-2, 0) \rightarrow A'(-1, 0)$$

$$B(-2, -6) \rightarrow B'(-1, -3)$$

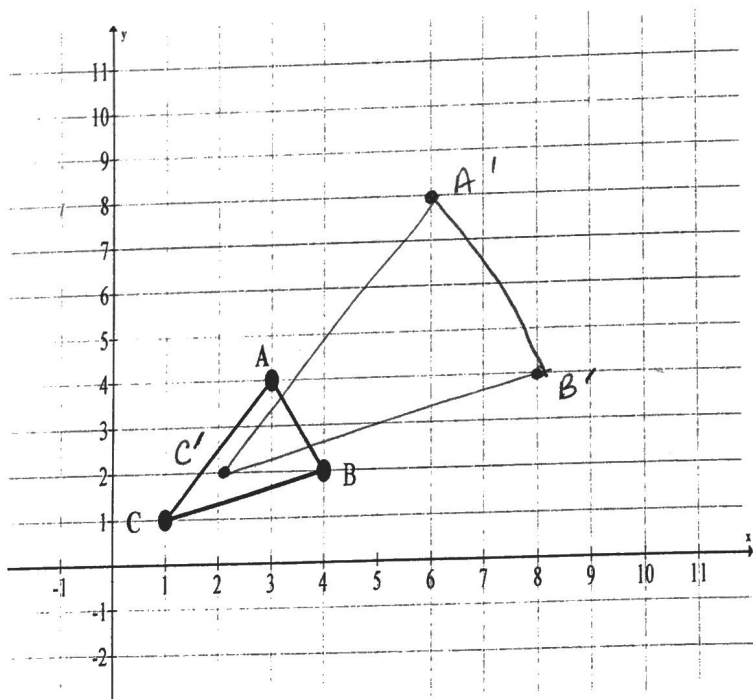
$$C(-4, -2) \rightarrow C'(-2, -1)$$

$$A \quad L2 \quad UD \quad x \frac{1}{2} \rightarrow L1 \quad UD$$

$$B \quad L2 \quad D6 \quad x \frac{1}{2} \rightarrow L1 \quad D3$$

$$C \quad L4 \quad D2 \quad x \frac{1}{2} \rightarrow L2 \quad D1$$

2. Find the coordinates of the vertices of the figure after a dilation of $k = 2$ centered at the origin (0,0) and graph the image.



$$A(3, 4) \rightarrow A'(6, 8)$$

$$B(4, 2) \rightarrow B'(8, 4)$$

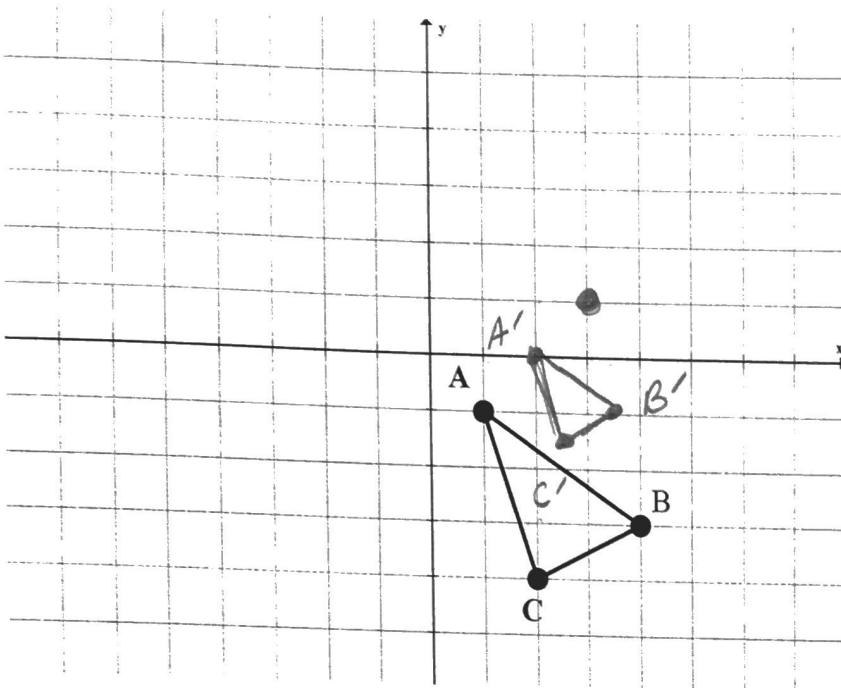
$$C(1, 1) \rightarrow C'(2, 2)$$

$$A \quad L3 \quad U4 \quad x 2 \rightarrow L6 \quad U8$$

$$B \quad L4 \quad U2 \quad x 2 \rightarrow L8 \quad U4$$

$$C \quad L1 \quad U1 \quad x 2 \rightarrow L2 \quad U2$$

3. Find the coordinates of the vertices of the figure after a dilation of $k = \frac{1}{2}$ centered at the point (3, 1) and graph the image. \Rightarrow Reduce

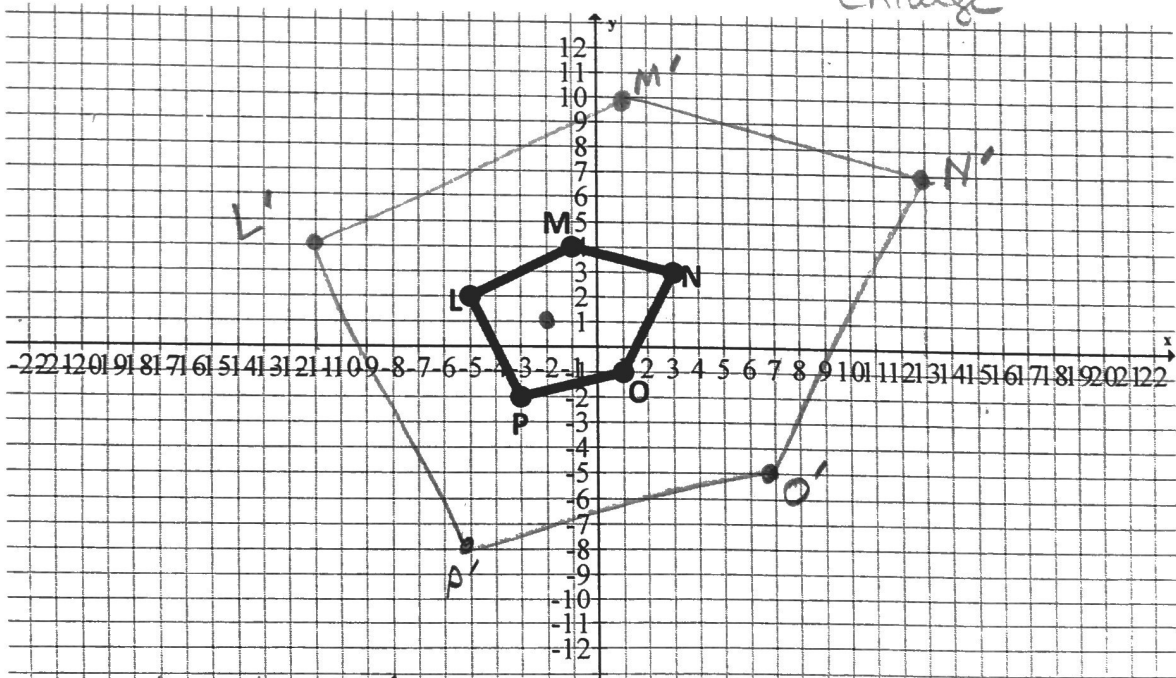


A L2 D2 $\times \frac{1}{2}$
 (L1, D1) $A'(2, 0)$

B R1, D4 $\times \frac{1}{2}$
 (R $\frac{1}{2}$, D2) $B'(3.5, -1)$

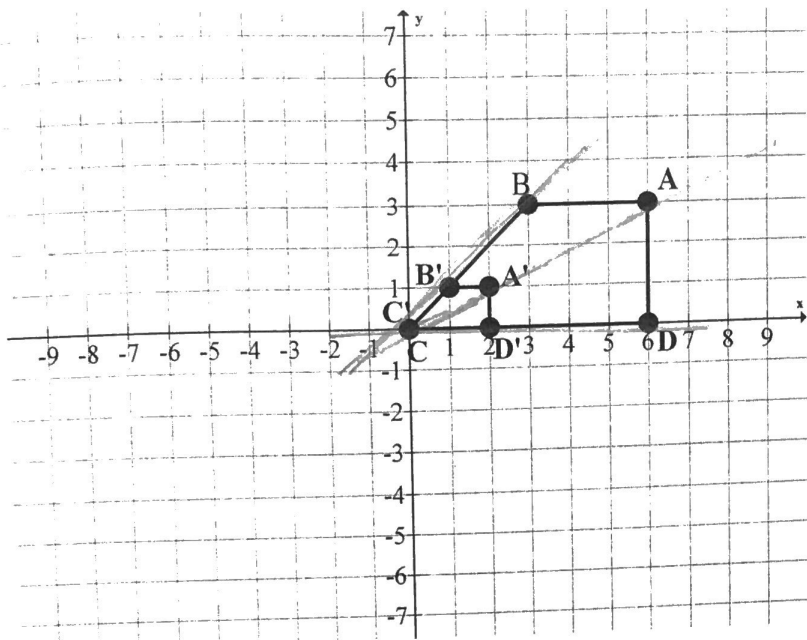
C L1, D5 $\times \frac{1}{2}$
 (R $\frac{1}{2}$, D2 $\frac{1}{2}$) $C'(2.5, -1.5)$

4. Find the coordinates of the vertices of the figure after a dilation of $k = 3$ centered at the point (-2, 1) and graph the image. $\overline{\text{enlarge}}$



$L'(-11, 4)$ $N'(13, 7)$ $P'(-5, -8)$
 $M'(1, 10)$ $O'(7, -5)$

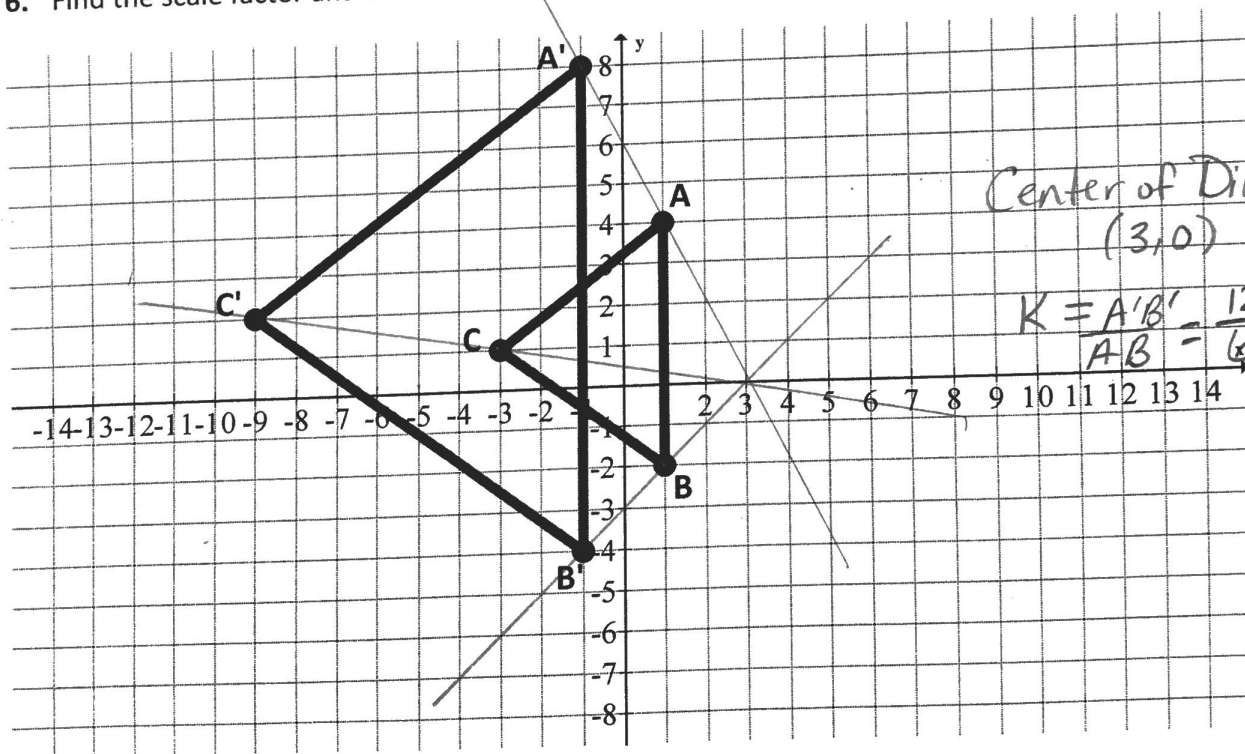
5. Find the scale factor and center of dilation for the figure below.



Center of Dilation
(0,0)

$$K = \frac{A'D'}{AD} = \frac{1}{3}$$

6. Find the scale factor and center of dilation for the figure below.



Center of Dilation
(3,0)

$$K = \frac{A'B'}{AB} = \frac{12}{6} = 2$$