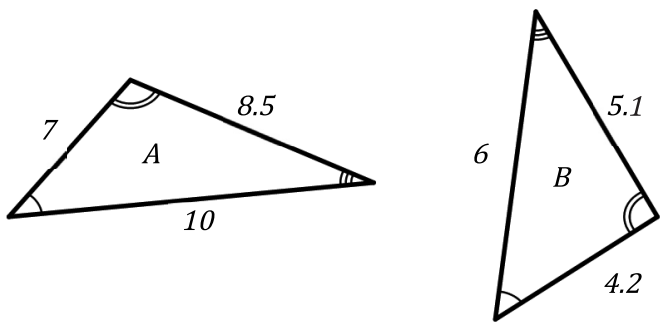
Section 4 – Topic 8
Dilation of Polygons

How is a ***dilation*** different from a translation, reflection, and rotation?

Consider the figures below.



Is Figure B a dilation of Figure A? Justify your answer.

What is the scale factor?

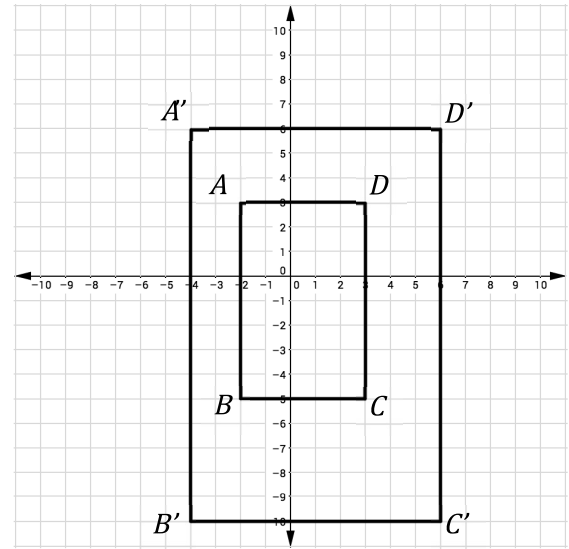
Is Figure A a dilation of Figure B? Justify your answer.

What is the scale factor?

We often represent a dilation with the following notation:

$$D_k = k(x, y)$$

Consider the dilation of quadrilateral $ABCD$ below.



What do you notice about the dilation represented in the figure above?

Let's Practice!

1. Pentagon $PENTA$ has coordinates $P(0,0), E(4,4), N(8,4), T(8,-4)$, and $A(4,-4)$ and is dilated at the origin with a scale factor of $\frac{3}{4}$.

   What are the coordinates of $P'E'N'T'A'$?

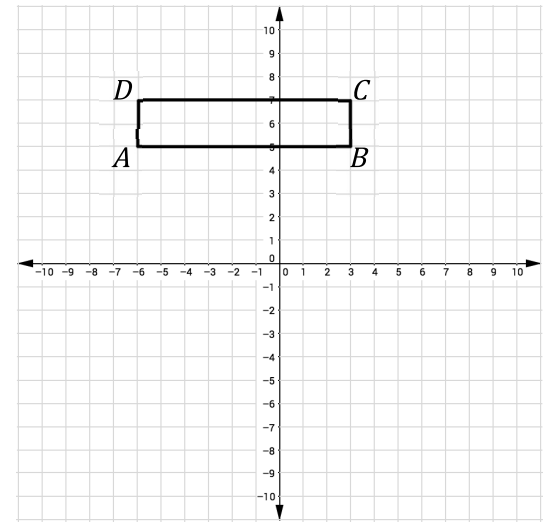
Try It!

2. Quadrilateral $PINT$ is dilated at the origin with a scale factor of $\frac{5}{3}$.

   Describe Quadrilateral $PINT$ and Quadrilateral $P'I'N'T'$ by filling in the table below with the most appropriate answer.

Quadrilateral $PINT$	Quadrilateral $P'I'N'T'$
(x, y)	(,)
$P(3,3)$	P'(,)
I(,)	$I'(10,15)$
N(,)	$N'(15,-5)$
$T(-3,-6)$	T'(,)

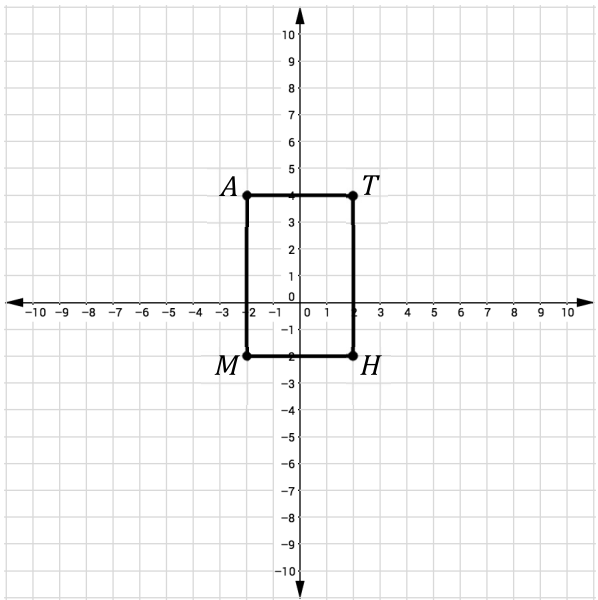
3. Consider rectangle $ABCD$.



Dilate $ABCD$ by a scale factor of $\frac{1}{2}$ using a center of dilation of $(1,1)$. Draw $A'B'C'D'$ on the same coordinate plane.

BEAT THE TEST!

1. Consider Quadrilateral $MATH$ on the figure below.



Quadrilateral $MATH$ is dilated by a scale factor of 0.5 centered at $(-2, -2)$ to create quadrilateral $M'A'T'H'$.

What is the difference between the y-coordinate of A' and the y-coordinate of T'?

The difference is ☐ units.

2. Triangle PRA was dilated by a scale factor of 3 centered at the origin to create triangle $P'R'A'$, which has coordinates $P'(-6, -12), R'(-18, -6), A'(-6, -6)$. Write the coordinates of the vertices of triangle PRA in the spaces provided below.

$P($ _____, _____ $)$

$R($ _____, _____ $)$

$A($ _____, _____ $)$