

Today we will be working with a new type of transformation. List the three previous transformations we have studied. For each transformation, explain what it does in "everyday language".

- Translation moves an object (left/right → up/down)
- Reflection creates a mirror image
- Rotation turns an object

These three transformations are known as *rigid transformations*. What similarity do you think these transformations have that makes them all *rigid transformations*?

The are all isometric (preimage  $\cong$  image)

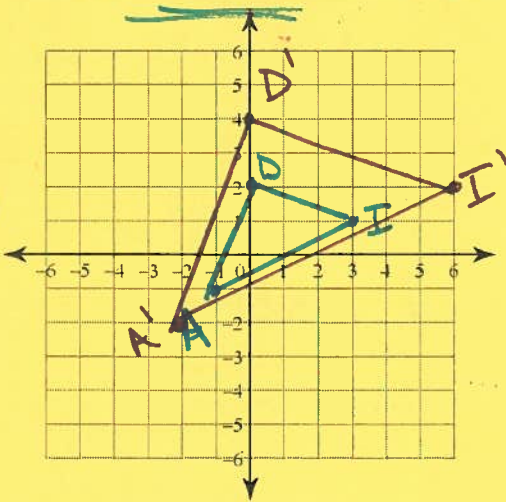
Now we are going to study dilations. Dilations change the *size* of the shape. They either expand the shape by a scale factor or they shrink the shape by a scale factor. What does scale factor mean?

Multiplying by a number to enlarge or shrink an object.

Do the following problem and then write down the process on the right:

Dilate  $\triangle ADI$ ,  $A(-1,-1)$ ,  $D(0,2)$ ,  $I(3,1)$  by a scale factor of 2 from the origin.

$A'(-2, -2)$  How do you do a dilation from the origin?  
 $D'(0, 4)$   
 $I'(6, 2)$

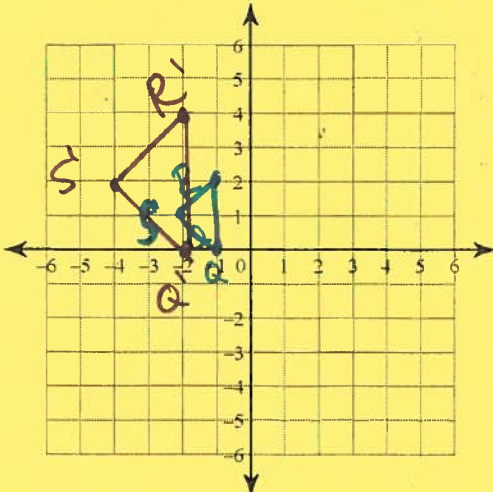


Multiply x & y coordinates by the scale factor

What are the important pieces of information given for a dilation?

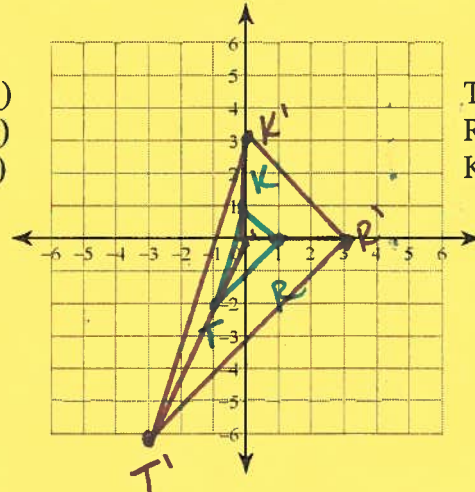
- Scale factor
- Center of dilation (ie: origin)

1) Dilate  $\triangle QRS$  if  $Q(-1,0)$ ,  $R(-1,2)$ ,  $S(-2,1)$  by a scale factor of 2 from the origin.



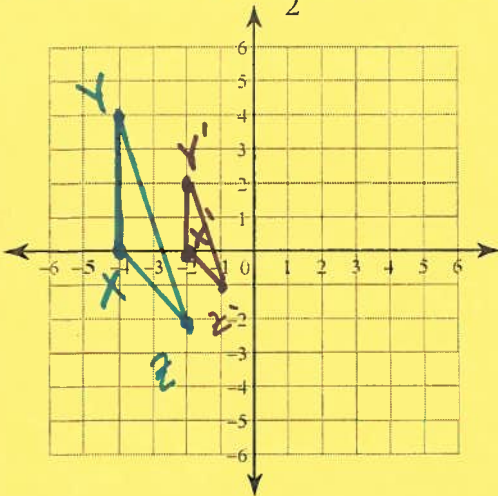
$Q'(-2, 0)$   
 $R'(-2, 4)$   
 $S'(-4, 2)$

2) Dilate  $\triangle TRK$  if  $T(-1,-2)$ ,  $R(1,0)$ ,  $K(0,1)$  by a scale factor of 3 from the origin.



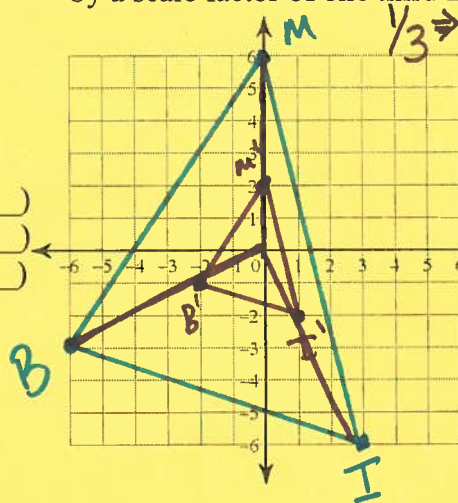
$T'(-3, -6)$   
 $R'(3, 0)$   
 $K'(0, 3)$

3) Dilate  $\triangle XYZ$  if  $X(-4,0)$ ,  $Y(-4,4)$ ,  $Z(-2,-2)$  by a scale factor of  $\frac{1}{2}$  from the origin.



$X'(-2, 0)$   
 $Y'(-2, 2)$   
 $Z'(-1, -1)$

4) Dilate  $\triangle IBM$  if  $I(3,-6)$ ,  $B(-6,-3)$ ,  $M(0,6)$  by a scale factor of one third from the origin.



$I'(1, -2)$   
 $B'(-2, -1)$   
 $M'(0, 2)$

5) Without graphing, what do you think the image points of  $\triangle DOG$  would be if you dilated the triangle using a scale factor of 7 and center of dilation at the origin?  $D(3, -2)$ ,  $O(-7, 12)$ ,  $G(-1, 5)$ .

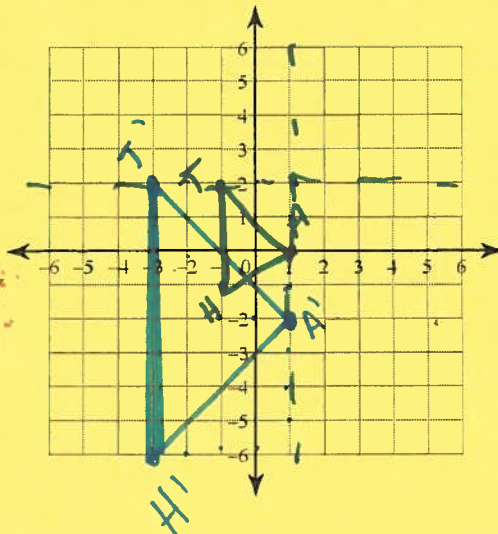
$D'(21, -14)$   
 $O'(-49, 84)$   
 $G'(-7, 35)$

6) On the graphs for problems 2 and 4 draw lines connecting the origin, which was our center of dilation, to the preimage points. What do you notice?

The image, preimage pt., and origin are collinear (lie on the same line).

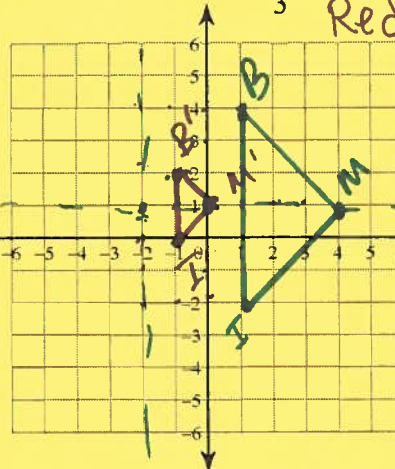
Do the following dilation problems:

7) Dilate  $\triangle HAT$  if  $H(-1,-1)$ ,  $A(1,0)$ ,  $T(-1,2)$  by a scale factor of 2 from the point  $(1,2)$



$H'(-3, -6)$   
 $A'(1, -2)$   
 $T'(-3, 2)$

8) Dilate  $\triangle IBM$  if  $I(1,-2)$ ,  $B(1,4)$ ,  $M(4,1)$  by a scale factor of  $\frac{1}{3}$  from the point  $(-2,1)$



$I'(-1, 0)$   
 $B'(-1, 2)$   
 $M'(0, 1)$