Notes: **DILATIONS**

TERM	DESCRIPTION	EXAMPLE
Dilation	A transformation that produces a similar figure by either enlarging or reducing the original figure by a scale factor, **k**.	
	A fixed point about which the preimage is enlarged or reduced,	Usually the origin, (0,0)
Scalar	A number, represented by the variable **k**, used as a multiplier in scaling. The ratio of the image to the preimage.	$\dfrac{\text{IMAGE}}{\text{PREIMAGE}}$
enlargement	A dilation with a scale factor greater than 1; the image is larger than the preimage.	$k > 1$
reduction	A dilation with a scale factor greater than 0 but less than 1; the image is smaller than the preimage.	$0 < k < 1$
	When the scale factor of 1 is applied the preimage and the image are the same shape and the same size.	$k = 1$

COORDINATE RULES FOR DILATIONS

**When a point P(a, b) is dilated by a scale factor k,
then the following rules apply to the coordinates:**

$$P\,(a,\,b) \rightarrow P'\,(ka,\,kb)$$

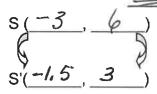*Use the given scale factor and center to dilate the figures and state the new coordinates. Graph the image.*
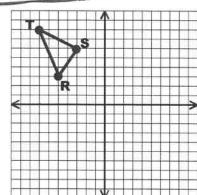
EXAMPLE 1   Scale Factor: 1/2; Center: (0,0)

S'(_____ , _____)   S (-3 , 6)

T'(_____ , _____)   S'(-1.5 , 3)

R'(_____ , _____)

T (-7 , 8)

(1) Find $\frac{1}{2}$ of each coordinate.   T'(-3.5 , 4)

(2) The "preimage" is $\triangle$STR. After the dilation (which was a reduction) the "image" is $\triangle$S'T'R'   R (-5 , 3)

* original figure: $\triangle$STR
New figure: $\triangle$S'T'R'
R'(-2.5 , 1.5)   K = $\frac{1}{2}$; reduction

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EXAMPLE 2:   Scale Factor: 3 ; Center: Origin

M'(_____ , _____)   M (1 , -2)

N'(_____ , _____)   M'(3 , -6)

O'(_____ , _____)

1) Find 3 times each coordinate   N (3 , 2)

2) the "preimage" is $\triangle$mNO. The "image" is $\triangle$m'N'O' which is an enlargement.   N'(9 , 6)

O (5 , -4)

O'(15 , -12)

* original figure: $\triangle$mNO
New figure: $\triangle$m'N'O'
K = 3; enlargement