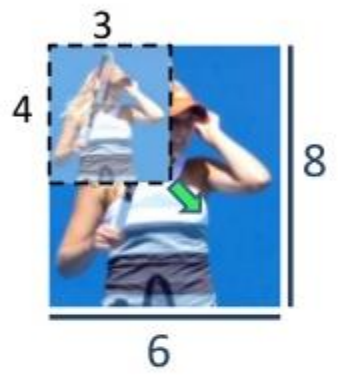


We will use Dilations<sub>1</sub> to show Proportional Relationships on a Coordinate Plane.

Activate Prior Knowledge

When creating a Dilation, how does the scale factor's size affect the size of the new figure?

# Enlargement and Reduction



If the **SCALE FACTOR** is Greater than 1 the resulting object is an **ENLARGEMENT**.



If the **SCALE FACTOR** is Less than 1 the resulting object is a **REDUCTION**.

Scale Factors less than 1 are expressed as Fractions:  $\frac{1}{4}$ ,  $\frac{1}{2}$ , or as decimals: 0.3 etc

### CFU # 1

What are we going to do?

What does *dilation* mean?  
**Dilation** means:

\_\_\_\_\_  
\_\_\_\_\_

### CFU # 2

If the scale factor is **GREATER THAN 1**, the new image or figure will be \_\_\_\_\_ than the original.

If the scale factor is **LESS THAN 1**, the new image or figure will be \_\_\_\_\_ than the original.

### Vocabulary

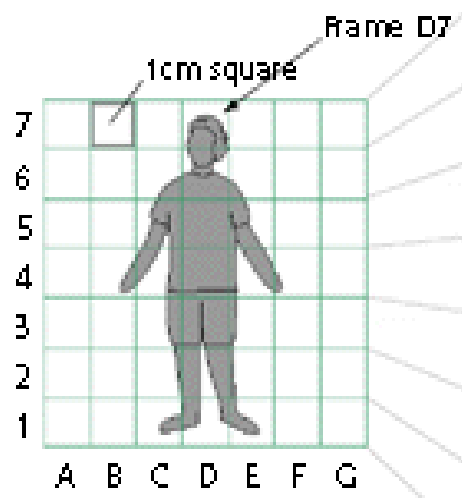
<sup>1</sup> enlargements or reductions in size

**Dilations show us enlargements or reductions.**

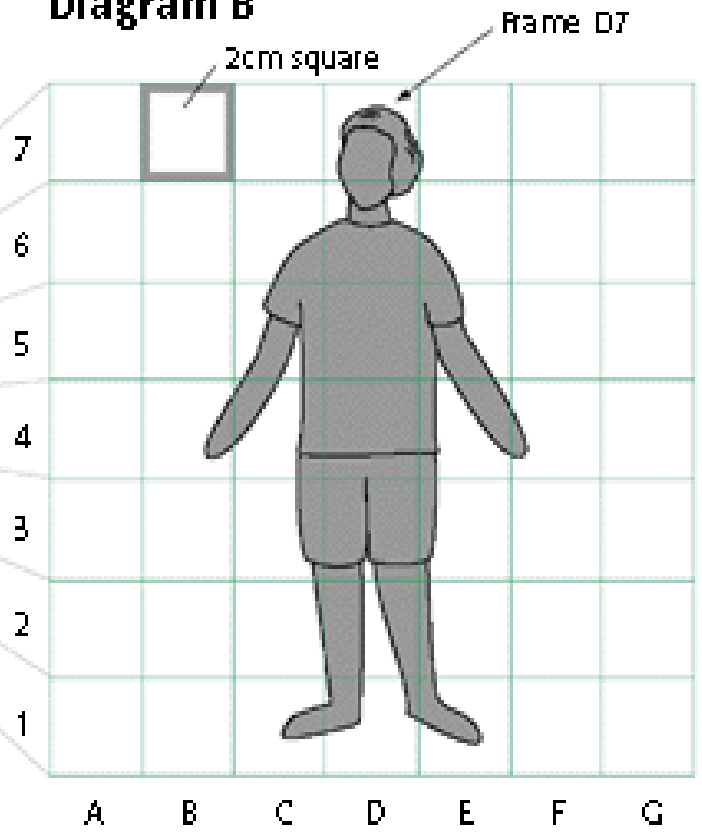
Describe the Scale Factor in the comparison of photos below.

Look at the figures below:

**Diagram A**

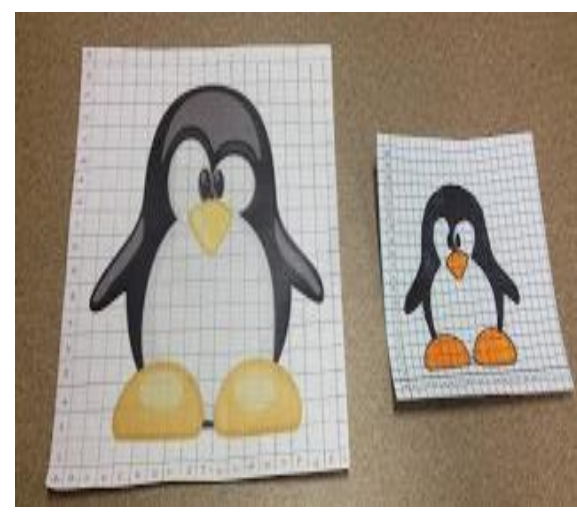


**Diagram B**



**CFU**

- 1 What does a dilation do to an image? A dilation \_\_\_\_\_.
- 2 If my figure is enlarged, I am multiplying by a factor greater than \_\_\_\_\_, which increases the size of my original.
- 3 If my figure is a reduction, I am multiplying by a factor less than \_\_\_\_\_ (I could also divide), which decreases the size of my original.



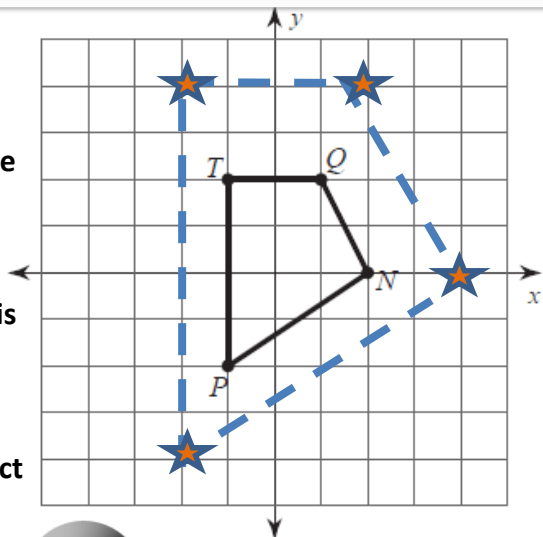
**Dilations show us enlargements or reductions. Follow the directions given below:**

1. Find your original coordinates for the pre-image (the original figure).
2. Multiply the factor of dilation by the original coordinates, then plot the points AND graph the new figure.

**EXAMPLE:**

**DILATION OF 2**

1. Find the coordinates of the original figure.
2. Multiply by the factor of dilation by the original figure's coordinates (in this case – multiply by 2.5).
3. Write your new ordered pairs (New Figure).
4. Plot the points and connect each point to create your new figure.

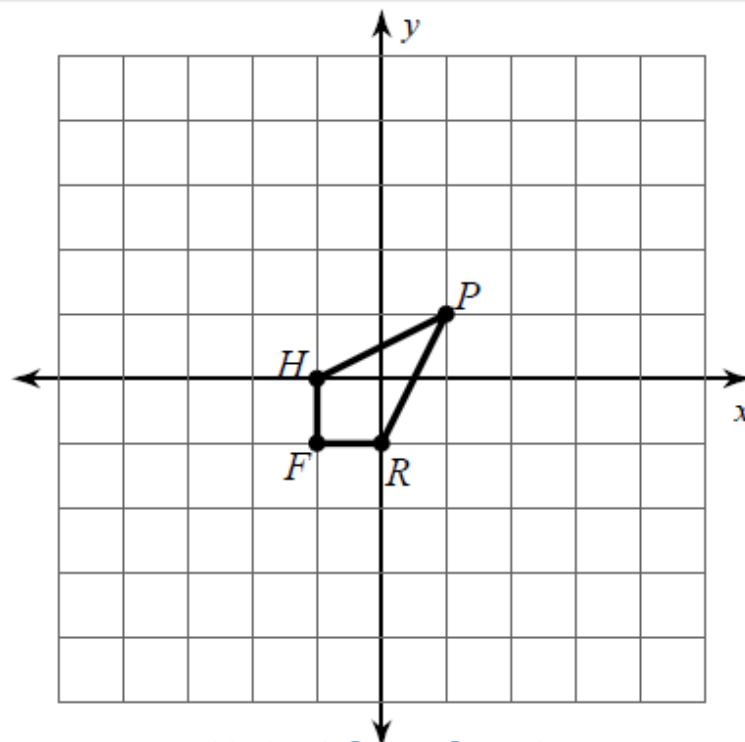


Original Figure



New Figure

T	( -1 , 2 )	x 2	T'	( -2 , 4 )
Q	( 1 , 2 )	x 2	Q'	( 2 , 4 )
N	( 2 , 0 )	x 2	N'	( 4 , 0 )
P	( -1 , -2 )	x 2	P'	( -2 , -4 )



**DILATION OF 4**

Original Figure



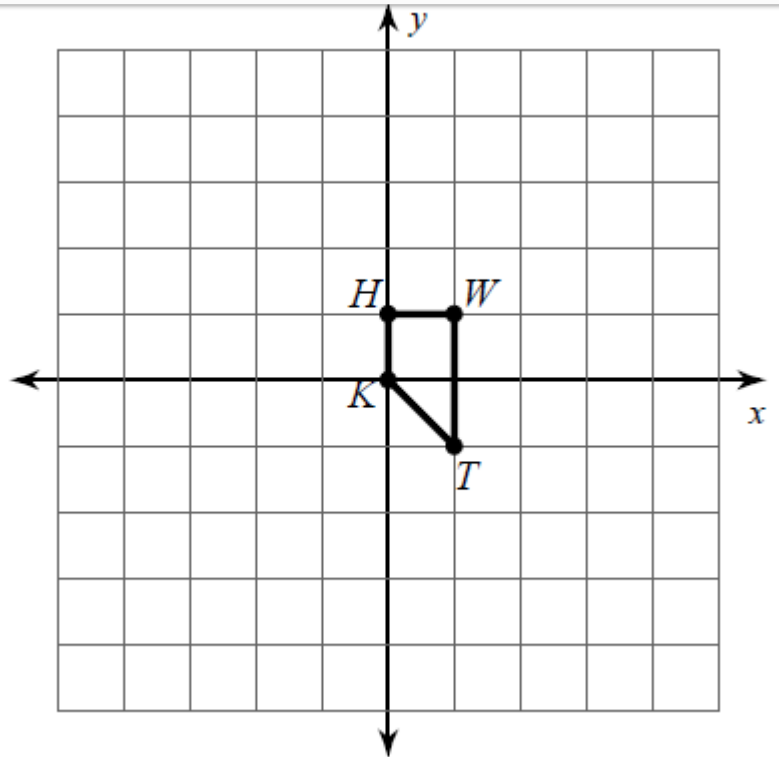
New Figure

P	( , )	P'	( , )
R	( , )	R'	( , )
F	( , )	F'	( , )
H	( , )	H'	( , )

**INTERPRETING YOUR GRAPH:** Because the dilation is greater than 1, your new image will be larger than the original, in this case 2 times the size of the original.

Dilations show us enlargements or reductions.

1. Find your original coordinates for the pre-image (the original drawing).
2. Multiply the factor of dilation by the original coordinates, then plot the points.

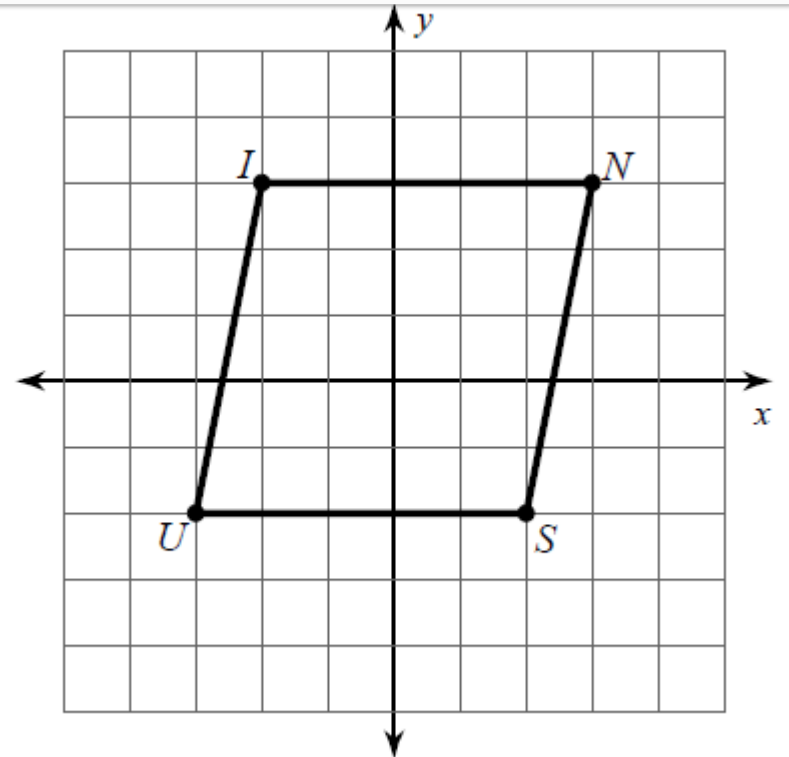


**DILATION OF 4**

Original Figure

New Figure

H ( -1, 1 )		H' ( -4, 4 )
K ( -1, 0 )		K' ( -4, 0 )
W ( 1, 1 )		W' ( 4, 4 )
T ( 1, -1 )		T' ( 4, -4 )



**DILATION OF 1.5**

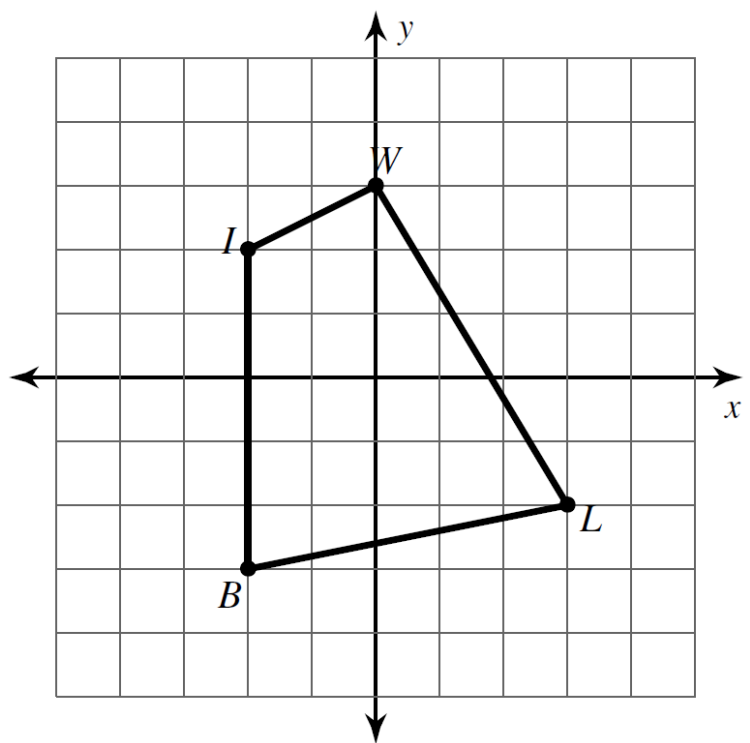
Original Figure

New Figure

I ( -2, 3 )		I' ( -3, 4.5 )
N ( 3, 3 )		N' ( 4.5, 4.5 )
S ( 3, -2 )		S' ( 4.5, -3 )
U ( -2, -2 )		U' ( -3, -3 )

Dilations show us enlargements or reductions.

1. Find your original coordinates for the pre-image (the original drawing).
2. Multiply the factor of dilation by the original coordinates, then plot the points.

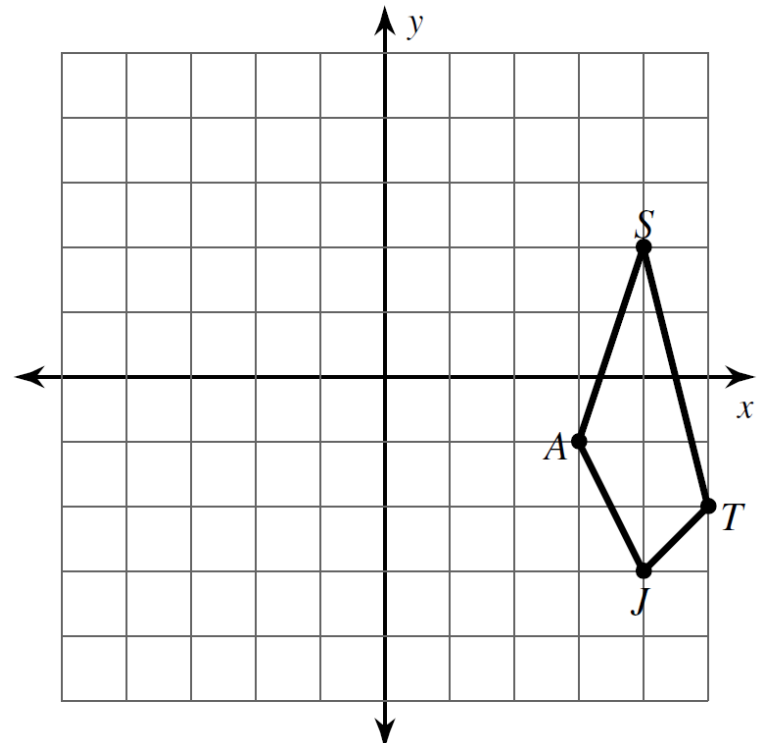


**DILATION OF 0.5**

Original Figure

New Figure

W ( 0 , 3 )	→	W' ( 0 , 1.5 )
I ( -2 , 2 )		I' ( -1 , 1 )
B ( -2 , -1 )		B' ( -1 , -0.5 )
L ( 3 , -2 )		L' ( 1.5 , -1 )



**DILATION OF 1/2**

Original Figure

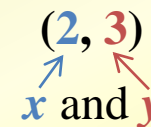
New Figure

S ( 2 , 3 )	→	S' ( 1 , 1.5 )
A ( 1 , 1 )		A' ( 0.5 , 0.5 )
J ( 2 , -1 )		J' ( 1 , -0.5 )
T ( 3 , -1 )		T' ( 1.5 , -0.5 )

**DILATIONS** enlarge or reduce the size of a figure. We can manipulate ordered pairs based on the dilation given.

**DILATIONS** greater than 1 will make a figure larger, while dilations less than one will make a figure smaller.

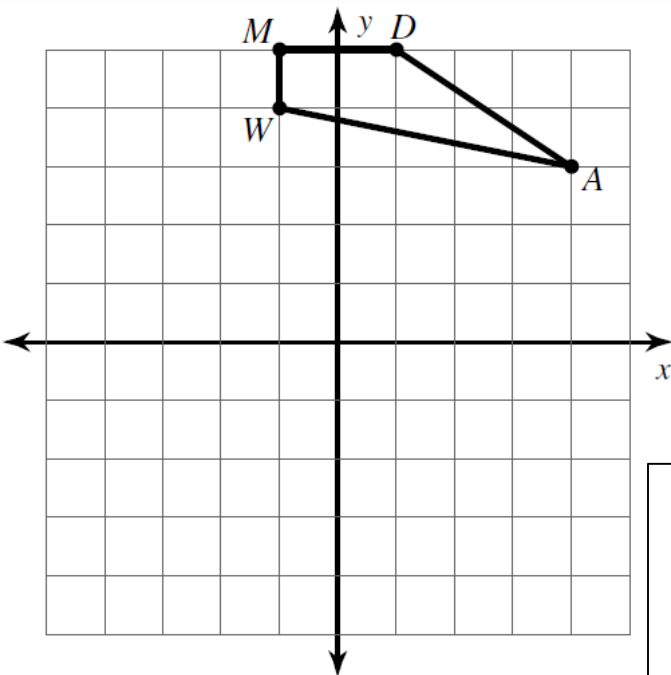
### Ordered Pair



### Skill Closure

Identify the points given on a coordinate plane.

- 1 Write ordered pairs for the each point shown.
- 2 Apply the factor of the dilation to the ordered pairs.
- 3 Identify and plot the new points, then sketch the figure.



### DILATION OF 0.5

M ( , )	M' ( , )
D ( , )	D' ( , )
A ( , )	A' ( , )
W ( , )	W' ( , )



Because the dilation is \_\_\_\_\_, the new image will be \_\_\_\_\_ than the original, in this case \_\_\_\_\_ the size of the original image.

### CFU

Which operations are used in dilations?

- A. Addition
- B. Subtraction
- C. Multiplication
- D. Division

### Word Bank

coordinates  
ordered pair  
dilation  
quadrant  
point  
plot  
enlargement  
reduction  
factor  
scale factor

### Summary Closure

What did you learn today about dilations / plotting and locating points on a coordinate plane?

(Pair-Share) Use and define each of the words from the word bank.

**DILATIONS** enlarge or reduce the size of a figure. We can manipulate ordered pairs based on the dilation given.

**DILATIONS** greater than 1 will make a figure larger, while dilations less than one will make a figure smaller.

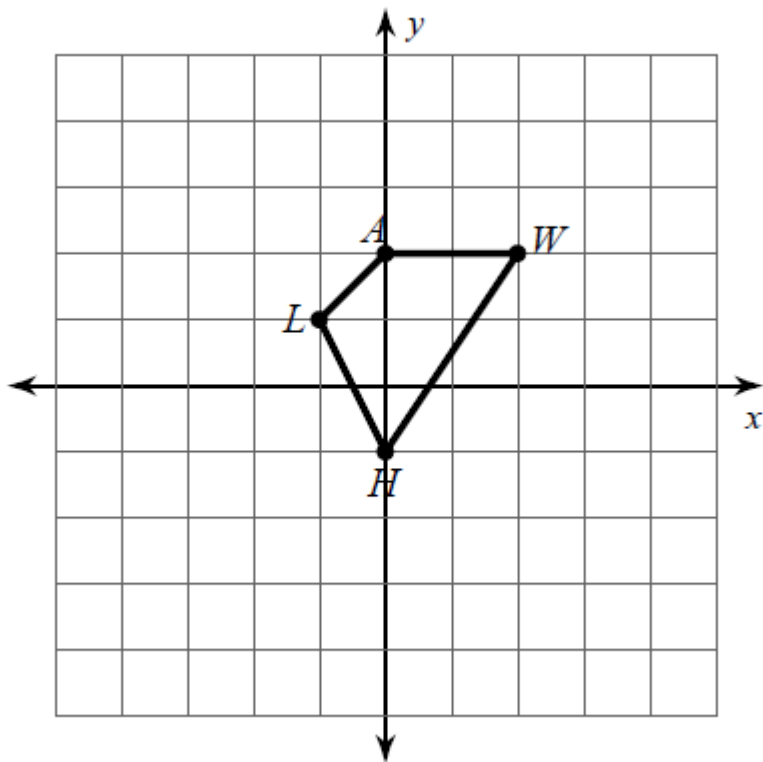
NAME \_\_\_\_\_

PERIOD \_\_\_\_\_

### Independent Practice

Identify the points given on a coordinate plane.

- 1 Write ordered pairs for the each point shown.
- 2 Apply the factor of the dilation to the ordered pairs.
- 3 Identify and plot the new points, then sketch the figure.



## DILATION OF 3

ORIGINAL FIGURE

NEW FIGURE

A ( , )

A' ( , )

W ( , )

W' ( , )

H ( , )

H' ( , )

L ( , )

L' ( , )



Because the dilation is \_\_\_\_\_ than 1, our new image will be \_\_\_\_\_ than the original, in this case \_\_\_\_\_ the size of the original.

**DILATIONS** enlarge or reduce the size of a figure. We can manipulate ordered pairs based on the dilation given.

**DILATIONS** greater than 1 will make a figure larger, while dilations less than one will make a figure smaller.

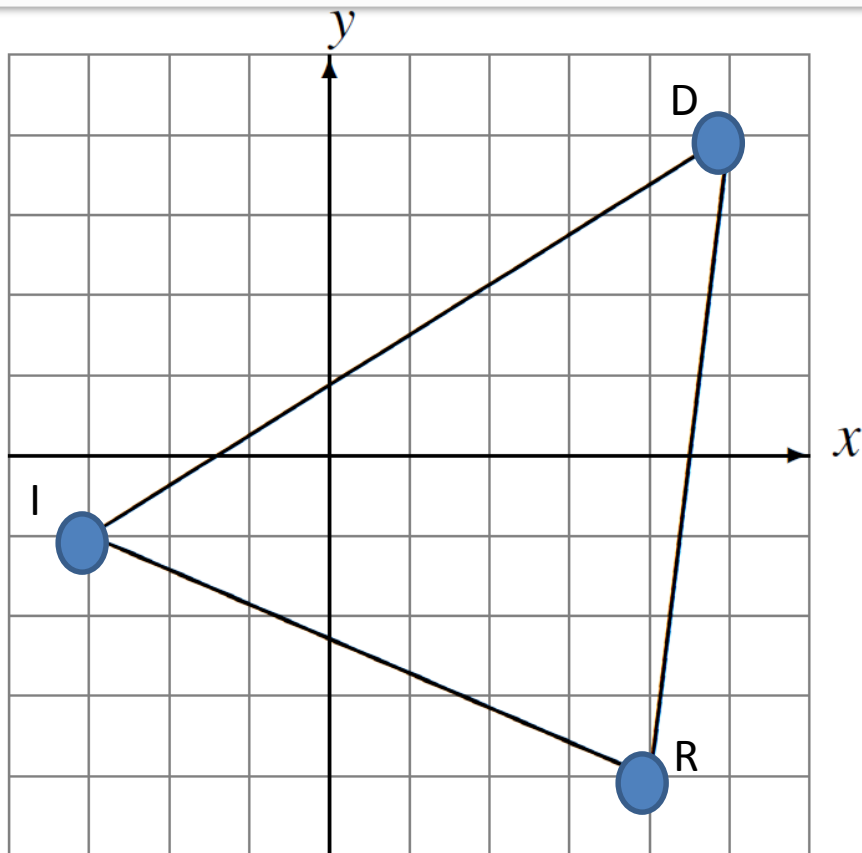
NAME \_\_\_\_\_

PERIOD \_\_\_\_\_

### Independent Practice

Identify the points given on a coordinate plane.

- 1 Write ordered pairs for the each point shown.
- 2 Apply the factor of the dilation to the ordered pairs.
- 3 Identify and plot the new points, then sketch the figure.



## DILATION OF 1/4

ORIGINAL FIGURE

D ( , )

R ( , )

I ( , )



NEW FIGURE

D' ( , )

R ( , )

I' ( , )