Geometry
WS- 9.5 Dilations & Distortions

Name KEY
Date_____ Period_____

Find the image of each point under each of the following transformations. (Complete all four transformations for each point.)

Point	$f(x, y) = (\frac{1}{4}x, \frac{1}{4}y)$	f(x, y) = (x, 3y)	f(x, y) = (4x, 4y)	f(x, y) = (0.5x, 0.5y)
1. (8, 4)	(2, 1)	(8, 24)	(32, 16)	(4, 2)
2. (-12, 3)	$(-3, \frac{3}{4})$	(-12, 9)	(-48, 12)	(-6, 1.5)
3. (-2, 2)	(-½, ½)	(-2, 6)	(-8, 8)	(-1, 1)
4. (0, 0)	(0, 0)	(0, 0)	(0, 0)	(0, 0)

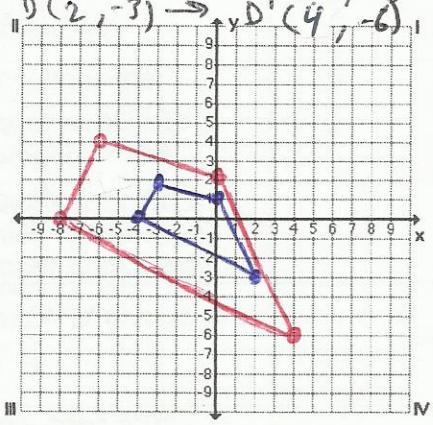
State the functional notation for the stretching, shrinking, expansion or contraction that maps the given point into the image point shown. Also, describe the transformation, i.e. horizontal shrink, vertical stretch, etc.

Mapping	Functional notation	Description
5. (5,3) → (5,6)	f(x, y) = (x, 2y)	vertical stretch
6. (3,2) → (6,4)	f(x, y) = (2x, 2y)	enlargement
7. (10,-2) → (5,-2)	f(x, y) = (½x, y)	horizontal shrink
8. (8,-8) → (4,-4)	f(x, y) = (½x, ½y)	reduction
9. (-5,8) → (-5/2,4)	f(x, y) = (½x, ½y)	reduction
10. (-6,-9) → (-4,-6)	f(x, y) = (⅔x, ⅔y)	reduction

Find the images of A(0,1), B(-3,2), C(-4,0), and D(2,-3). Draw ABCD. In another color, draw A′B′C′D′.

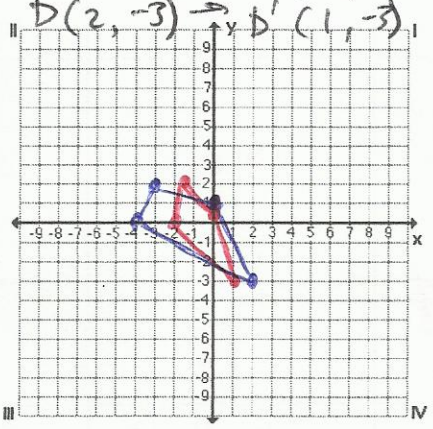
11. (x, y) = (2x, 2y)

A(0,1) → A′(0,2)
B(-3,2) → B′(-6,4)
C(-4,0) → C′(-8,0)
D(2,-3) → D′(4,-6)



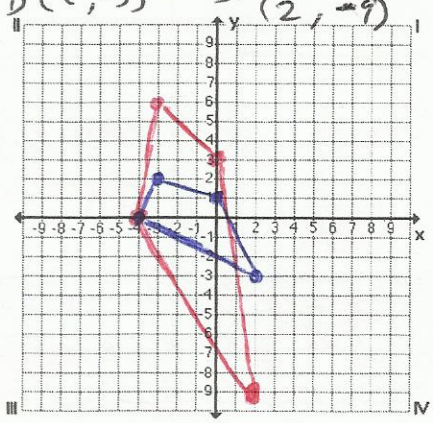
12. (x, y) = (0.5x, y)

A(0,1) → A′(0,1)
B(-3,2) → B′(-3/2,2)
C(-4,0) → C′(-2,0)
D(2,-3) → D′(1,-3)

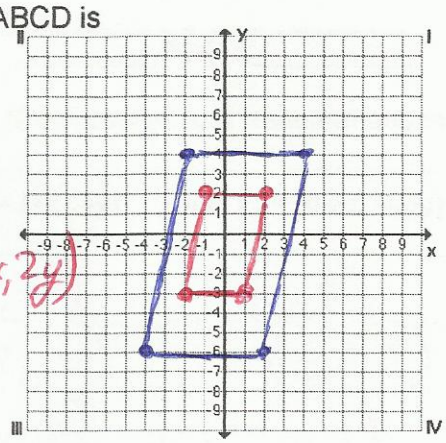


13. (x, y) = (x, 3y)

A(0,1) → A′(0,3)
B(-3,2) → B′(-3,6)
C(-4,0) → C′(-4,0)
D(2,-3) → D′(2,-9)



14. Graph the points A(-1,2), B(2,2), C(1,-3), and D(-2,-3). Quadrilateral ABCD is mapped to quadrilateral A′B′C′D′ under a dilation.
A′(-2,4), B′(4,4), C′(2,-6), and D′(-4,-6).



What kind of dilation does this represent? enlargement

What is the scale factor from ABCD to A′B′C′D′? 2

Describe this dilation in functional notation. or $f(x,y)=(2x,2y)$

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15. Given the points A(-2, 4) and B(6, 10), find:

a) slope of $\overleftrightarrow{AB}$: $\frac{3}{4}$

b) equation of $\overleftrightarrow{AB}$ (pt-slope form): $y-10=\frac{3}{4}(x-6)$

c) length of $\overline{AB}$: $D_{AB}=\sqrt{(6+2)^2+(10-4)^2}=\sqrt{100}=\boxed{10}$
$=\sqrt{64+36}$

Fill in the table by using the functions in the first row below and points A and B above.

	f(x, y) = (2x, 2y)	f(x, y) = ($\frac{1}{2}$x, $\frac{1}{2}$y)	f(x, y) = (2x, y)	f(x, y) = (x, $\frac{1}{2}$y)
Using the transformation at the top of the column find A′ & B′	A′=(-4, 8) B′=(12, 20)	A′=(-1, 2) B′=(3, 5)	A′=(-4, 4) B′=(12, 10)	A′=(-2, 2) B′=(6, 5)
Find slope of $\overline{A'B'}$	3/4	3/4	3/8	3/8
How does slope of $\overline{A'B'}$ compare with slope of $\overleftrightarrow{AB}$?	Same	Same	Slope of $\overline{A'B'}$ is half slope of $\overline{AB}$	Slope of $\overline{A'B'}$ is half the slope of $\overline{AB}$
Write the equation of $\overleftrightarrow{A'B'}$ in point-slope form.	$y-20=\frac{3}{4}(x-12)$	$y-5=\frac{3}{4}(x-3)$	$y-10=\frac{3}{8}(x-12)$	$y-5=\frac{3}{8}(x-6)$
How does the equation of $\overleftrightarrow{A'B'}$ compare to the equation of $\overleftrightarrow{AB}$? (Hint: How do their slopes compare?)	Same	Same	1/2 slope of $\overline{AB}$	1/2 slope of $\overline{AB}$
Find A′B′ (length of $\overline{A'B'}$)	20	5	$\sqrt{16^2+6^2}$ $\sqrt{256+36}=292$ $\boxed{2\sqrt{73} \text{ or } 17.1}$	$\sqrt{8^2+3^2}$ $\boxed{\sqrt{73}\approx 8.5}$
How does A′B′ compare to AB?	Twice as long	Half as long	About 1.7 times as long (longer)	About 0.85 times as long (shorter)