DILATIONS

Enlargement $k > 1$
Reduction $0 < k < 1$
Proportionality maintained
Scale Factor, k
$A \to B$ $\frac{B}{A}$

Geometry
Dilations Worksheet

Name _____

State whether a dilation with the given scale factor is a reduction or an enlargement.

1. $k = 3$ Enlarge

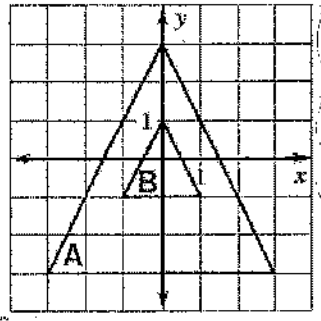
2. $k = \frac{1}{3}$ Reduce

3. $k = \frac{5}{4}$ Enlarge

4. $k = 0.93$ Reduce

Determine whether the dilation from Figure A to Figure B is a *reduction* or an *enlargement*. Then find its scale factor.

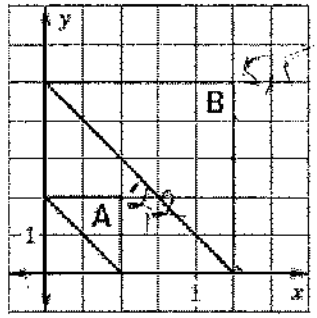
5.



(0, 3) (0, 1)
(3, -3) (1, -1)
(-3, -3) (-1, -1)
$\frac{1}{3}$

Reduction $k =$ $\frac{1}{3}$

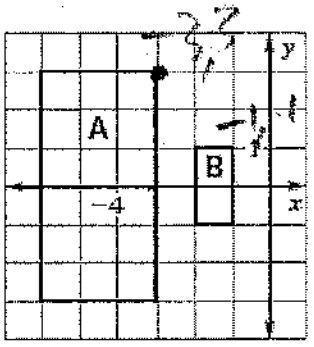
6.



$A \to B$
2, 2 → 5, 5
$\frac{5}{2}$

Enlargement $k =$ $\frac{5}{2}$

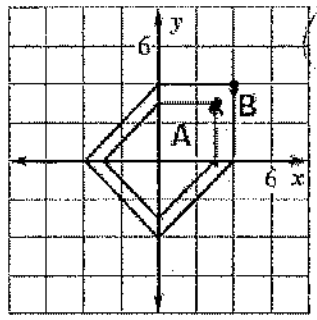
7.



-3, 3 → -1, 1

Reduction $k =$ $\frac{1}{3}$

8.



(1.5, 2) → (2, 3)
$\frac{2}{1.5} = \frac{4}{3}$

Enlargement $k =$ $\frac{4}{3}$

Point A is a vertex of a polygon. Point R is the image of A after the dilation. Find the scale factor of the dilation.

9. A (3, 4) and R (9, 12)

$A \to R$ $\frac{R}{A}$
$\frac{9}{3} = 3$ $\frac{12}{4} = 3$ $k = 3$

10. A (9, 12) and R (6, 8)

$\frac{6}{9} = \frac{2}{3}$ $\frac{8}{12} = \frac{2}{3}$
$k = \frac{2}{3}$

11. A (-2, -3) and R (-10, -15)

$\frac{-10}{-2} = 5$ $\frac{-15}{-3} = 5$
$k = 5$

A line segment has the given endpoints. Use the scale factor to write the ordered pairs after the dilation.

12. A(1,1), B (3, 1), and k = 2

A'(2, 2) B'(6, 2)

13. A(4,4), B(8, 12), and k = ¾

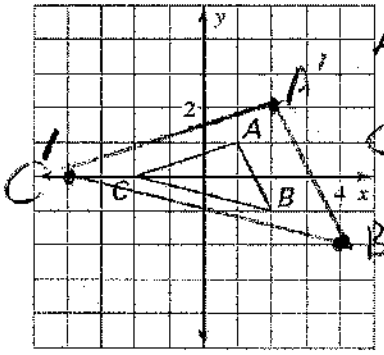
A'(3, 3) B'(6, 9)

14. A(0, 0), B(-3, 2), and k = 5

A'(0, 0) B'(-15, 10)

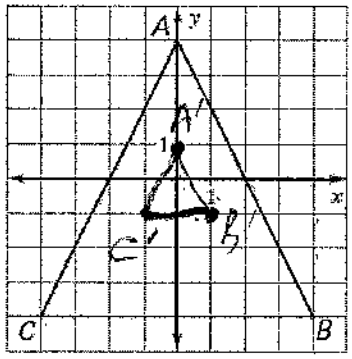
Draw a dilation of the figure using the given scale factor.

15. k = 2



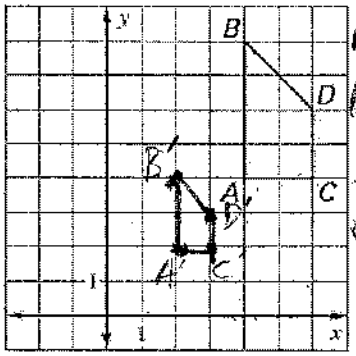
A(1,1) A'(2,2)
B(2,-1) B'(4,-2)
C(-2,0) C'(-4,0)

16. k = ¼



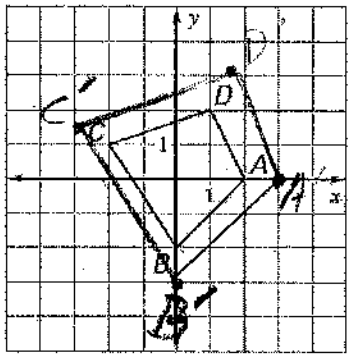
A(0,4) A'(0,1)
B(4,-4) B'(1,-1)
C(-4,-4) C'(-1,-1)

17. k = ½



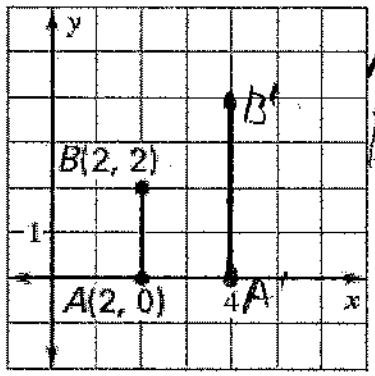
A(4,0) A'(2,0)
B(4,8) B'(2,4)
D(6,6) D'(3,3)
C(6,4) C'(3,2)

18. k = 1 ½



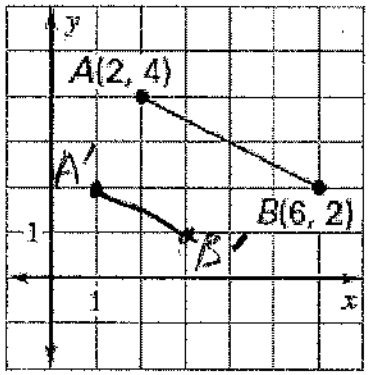
A(2,0) A'(3,0)
B(0,-2) B'(0,-3)
C(-2,1) C'(-3,1.5)
D(1,2) D'(1.5,3)

19. k = 2



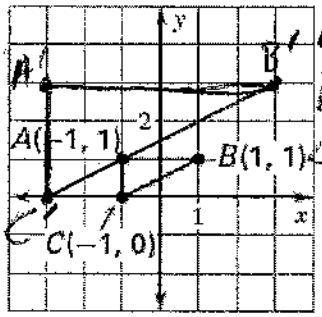
A(2,0) A'(4,0)
B(2,2) B'(4,4)

20. k = ½



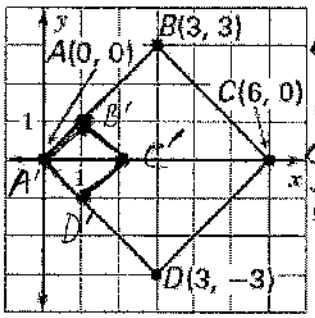
A(2,4) A'(1,2)
B(6,2) B'(3,1)

21. k = 3



A(-1,1) A'(-3,3)
B(1,1) B'(3,3)
C(-1,0) C'(-3,0)

22. k = 1/3

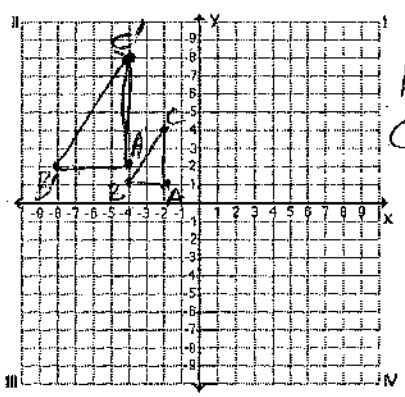


A(0,0) A'(0,0)
B(3,3) B'(1,1)
C(6,0) C'(2,0)
D(3,-3) D'(1,-1)

KEY

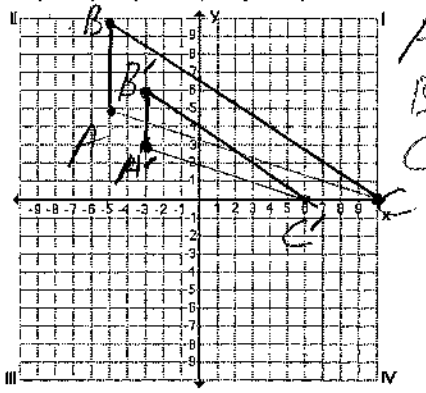
Draw a dilation of the polygon with the given vertices using the given scale factor. Plot the ordered pairs on the coordinate plane AND the dilation.

23. A(-2, 1), B(-4, 1), C(-2, 4); k = 2



A' (-4,2)
B' (-8,2)
C' (-4,8)

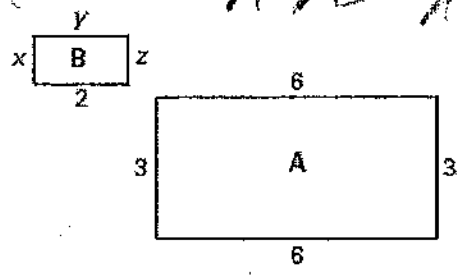
24. A(-5, 5), B(-5, 10), C(10, 0); k = 3/5



A' (-3,3)
B' (-3,6)
C' (6,0)

Determine whether the dilation from Figure A to Figure B is a reduction or an enlargement. Then, find the values of the variables.

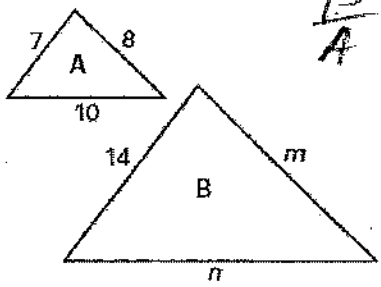
25.



A → B $\frac{B}{A} = \frac{2}{6} = \frac{1}{3}$

$\frac{1}{3} = \frac{x}{3}$
$x = 1$
$z = 1$
$y = 2$

26.

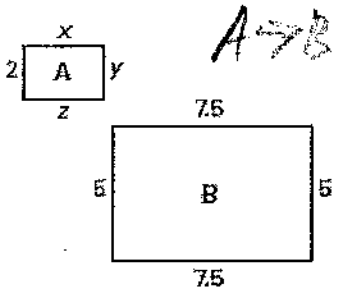


$\frac{B}{A} = \frac{14}{7} = 2$

$\frac{2}{1} = \frac{n}{10}$
$n = 20$

$\frac{2}{1} = \frac{m}{7}$
$m = 14$

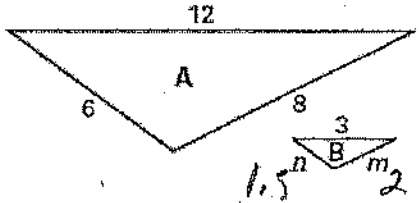
27.



A → B $\frac{B}{A} = \frac{5}{2}$

$\frac{7.5}{z} = \frac{5}{2}$
$5z = 15$
$z = 3$
$x = 7.5$
$y = 3$

28.



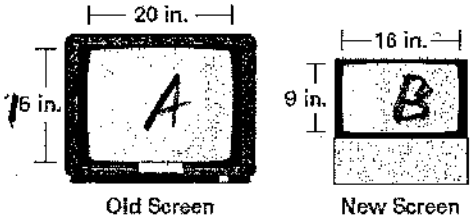
A → B $\frac{B}{A}$

$\frac{3}{12} = \frac{1}{4}$

$\frac{n}{6} = \frac{1}{4}$
$4n = 6$
$n = 1.5$

$\frac{m}{8} = \frac{1}{4}$
$4m = 8$
$m = 2$

29. The screen on your old television is 20 inches wide and 15 inches high. The screen on your new widescreen television is 16 inches wide and 9 inches high. Is the screen on your new TV a dilation of the screen on your old TV? Explain.



A → B $\frac{B}{A}$

$\frac{16}{20} = \frac{9}{15}$

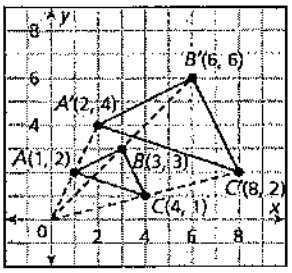
$9 \cdot 20 = 15 \cdot 16$
$180 \neq 240$

No Dilation

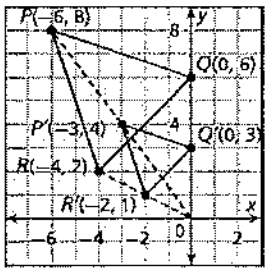
KEY

Name_____ Date_____ Class_____

Standard MCC9-12.G.SRT.1:
A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.

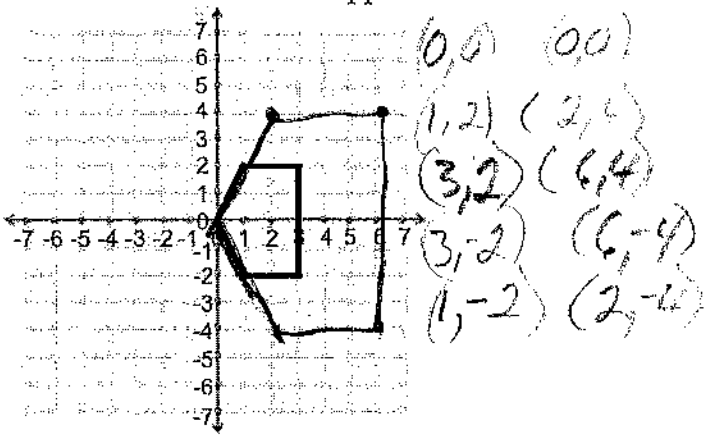


(from #1 above)



(from #2 above)

What if the center of the dilation passes through one of the sides of the triangle? Draw a dilation with a factor of 2 to see what happens.



SIMILARITY OF DIFFERENT SHAPES:

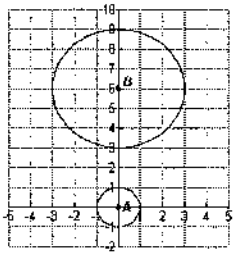
Squares? YES or NO

Rectangles? YES or NO

Equilateral Triangle? YES or NO

Isosceles Triangle? YES or NO

Circles? YES or NO



Name KEY Date 4 Class

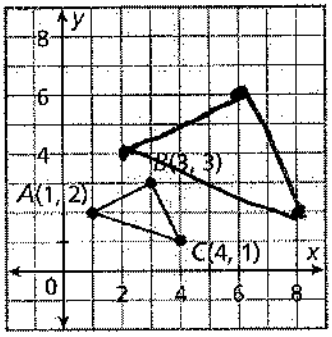
CCGPS Geometry 6.1 Practice

Similarity and Transformations

Apply the dilation *D* to the polygon with the given vertices. Describe the dilation as an enlargement or a reduction.

1. $D: (x, y) \rightarrow (2x, 2y)$

$A(1, 2)$, $B(3, 3)$, $C(4, 1)$



Enlarge

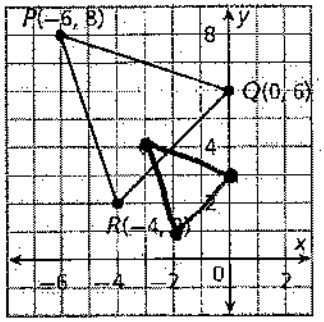
A' 2, 4

B' 6, 6

C' 8, 2

2. $D: (x, y) \rightarrow (\frac{1}{2}x, \frac{1}{2}y)$

$P(-6, 8)$, $Q(0, 6)$, $R(-4, 2)$



Reduce

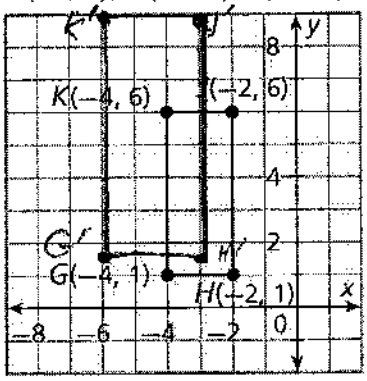
P' −3, 4

Q' 0, 3

R' −2, 1

3. $D: (x, y) \rightarrow (1.5x, 1.5y)$

$G(-4, 1)$, $H(-2, 1)$, $J(-2, 6)$, $K(-4, 6)$



G' −6, 1.5

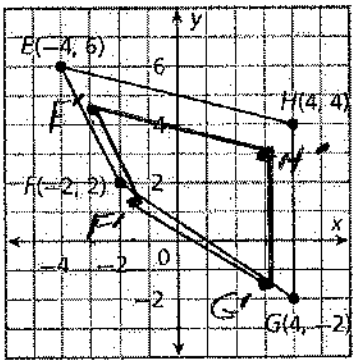
H' −3, 1.5

J' −3, 9

K' −6, 9

4. $D: (x, y) \rightarrow (0.75x, 0.75y)$

$E(-4, 6)$, $F(-2, 2)$, $G(4, -2)$, $H(4, 4)$



E' −3, 4.5

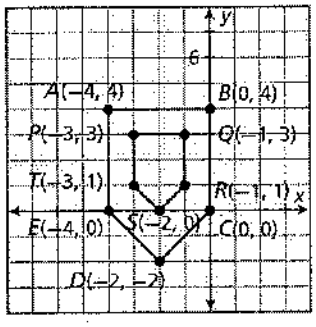
F' −1.5, 1.5

G' 3, −1.5

H' 3, 3

Determine whether the polygons with the given vertices are similar. ***Hint: check the lengths of their sides.***

5. $A(-4, 4)$, $B(0, 4)$, $C(0, 0)$, $D(-2, -2)$, $E(-4, 0)$; $P(-3, 3)$, $Q(-1, 3)$, $R(-1, 1)$, $S(-2, 0)$, $T(-3, 1)$



$\overline{AB} = 4$ $\overline{PQ} = 2$

$\overline{BC} = 4$ $\overline{QR} = 2$

$\overline{AE} = 4$ $\overline{TP} = 2$

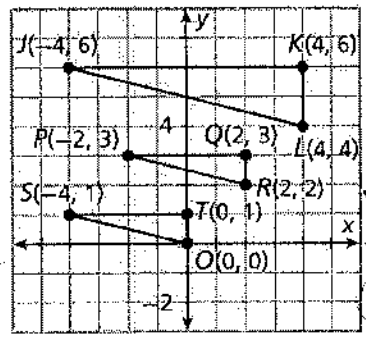
$\overline{ED} = 2\sqrt{2}$ $\overline{TS} = 1\sqrt{2}$

$\overline{DC} = 2\sqrt{2}$ $\overline{RS} = 1\sqrt{2}$

All Corresponding Sides Proportional

ABCDE ~ PQRST

6. $J(-4, 6)$, $K(4, 6)$, $L(4, 4)$; $P(-2, 3)$, $Q(2, 3)$, $R(2, 2)$; $S(-4, 1)$, $T(0, 1)$, $O(0, 0)$



$JK = 8$ $PQ = 4$ $ST = 4$

$KL = 2$ $QR = 1$ $TO = 1$

$JL = \sqrt{68} = 2\sqrt{17}$

$PR = \sqrt{5}$

$RP = \sqrt{10} = \sqrt{17}$

All sides proportional

$\triangle JKL \sim \triangle PQR \sim \triangle STO$