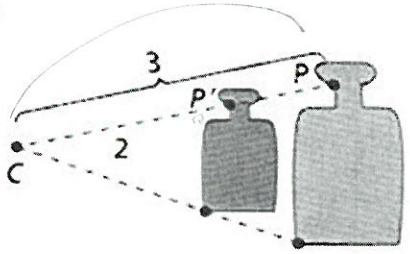
Dilations – key

Identify the dilation and find its scale factor

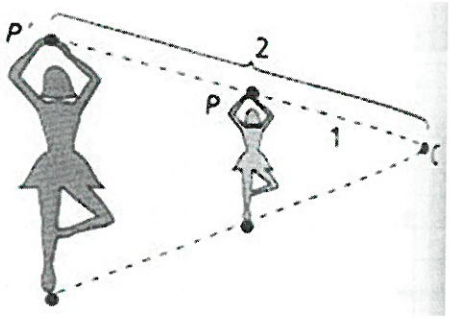
a.



reduction

$k = \frac{\text{new}}{\text{old}} = \frac{2}{3}$

b.



enlargement

$k = \frac{2}{1} = 2$

(-5,-5)

A(-3,-1) +4 +8 A'(-1,3)

2(+2,+4)

(-5,-5)

B(-1,-2) +8 +6 B'(3,1)

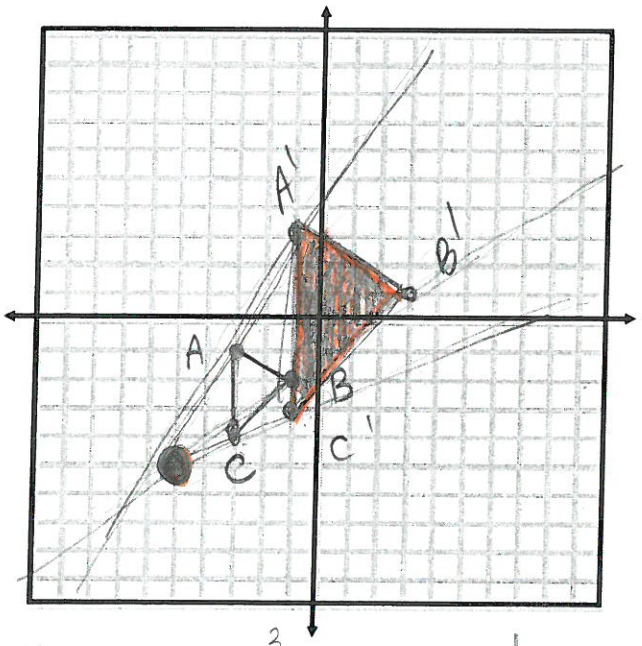
2(+4,+3)

(-5,-5)

C(-3,-4) +4 +2 C'(-1,-3)

2(+2,+1)

Example 1: Dilate the coordinates of triangle ABC with A(-3,-1), B(-1,-2) and C(-3,-4) using a scale factor of 2, center of dilation at (-5,-5)



A'(-1,3)

B'(3,1)

C'(-1,-3)

$\frac{1}{2}$ $\frac{3}{4}$ $\frac{1}{2}$

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

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

$y-y_1=m(x-x_1)$

$y+1=2(x+3)$

$y=2(x+3)-1$

$y-y_1=m(x-x_1)$

$y+3=\frac{1}{2}(x+1)$

$y=\frac{1}{2}(x+1)-3$

$2(x+3)-1=\frac{1}{2}(x+1)-3$

$2x+6-1=.5x+.5-3$

$2x+5=.5x-2.5$

$1.5x=-7.5$

$x=-5$ (-5,-5)

$y=-5$

$2(-5+3)-1$

$2(-2)-1=-5$

$k=\frac{4}{2}=2$

Ocent

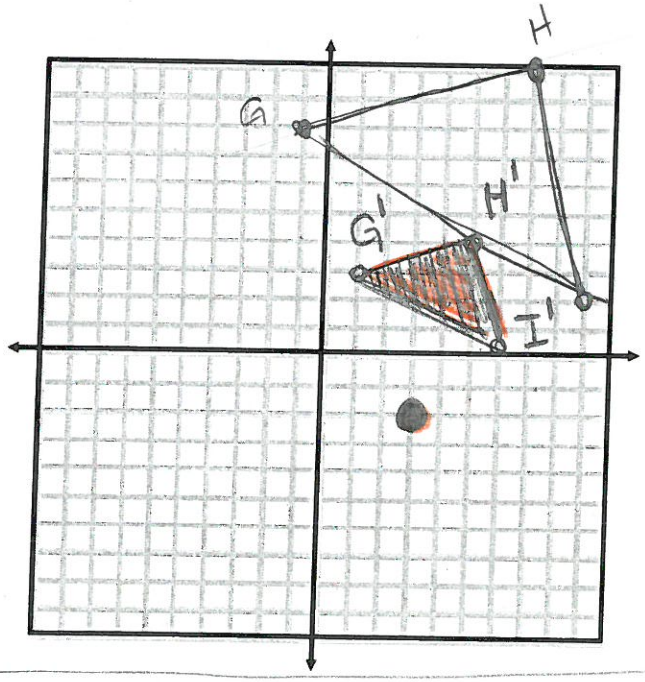
$(3,-2) \rightarrow G(-1,8)$ $\quad H(7,10)$ $\quad I(9,2)$

$\frac{1}{2}(-4,+10)$ $\quad \frac{1}{2}(+4,+12)$ $\quad \frac{1}{2}(+6,+4)$

$(-2,+5)$ $\quad (+2,+6)$ $\quad (+3,+2)$

$G'(1,3)$ $\quad H'(5,4)$ $\quad I'(6,0)$

Example 2: Dilate the coordinates of triangle GHI with G(-1,8), H(7,10) and I(9,2) using a scale factor of 1/2, center of dilation at (3,-2)



G'(1,3)

H'(5,4)

I'(6,0)

$G(-1,8)$ $\quad H(7,10)$ $\quad I(9,2)$

$G'(1,3)$ $\quad H'(5,4)$ $\quad I'(6,0)$

$\frac{-5}{2}$ $\quad \frac{-6}{-2}=3$ $\quad \frac{-2}{-3}=\frac{2}{3}$

$y-3=-\frac{5}{2}(x-1)$ $\quad y-4=3(x-5)$

$y=-\frac{5}{2}(x-1)+3$ $\quad y=3(x-5)+4$

$-\frac{5}{2}(x-1)+3=3(x-5)+4$

$-2.5x+2.5+3=3x-15+4$

$-2.5x+5.5=3x-11$

$16.5=5.5x$

$x=3$ $\quad$ center $(3,-2)$

$y=3(3-5)+4$

$3(-2)+4$

$-6+4=-2$

$k=\frac{-2}{-4}=\frac{1}{2}$

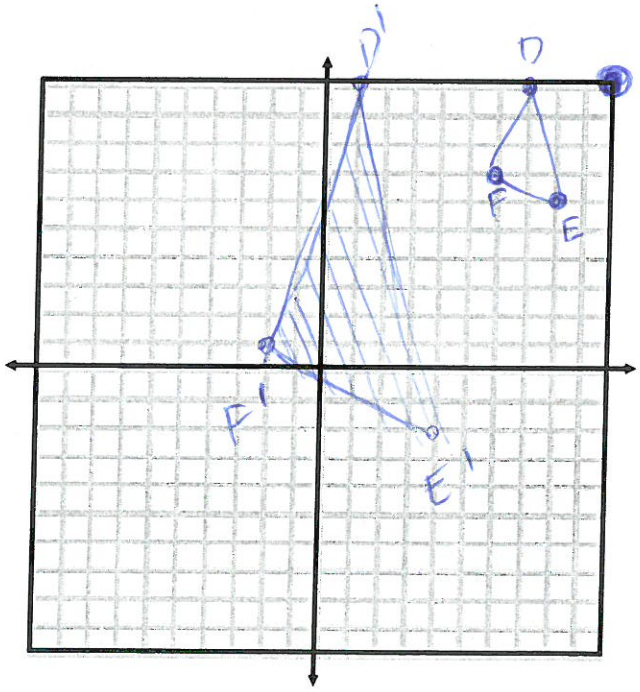
10,10
(+3, 0) (+9, 0)
D(7, 10) D'(1 10)

(10,10)
3 (-2,-4) -6,-12
E(8,6) E'(4, -2)

(10,10)
3(-4 -3
E (6,7)

10 , 10
-12 -9
(-2, 1)

Example 3: Dilate the coordinates of triangle DEF with D(7,10), E(8,6) and F(6,7) using a scale factor of 3, center of dilation at (10,10)



D'(1, 10)

E'(4, -2)

F'(-2, 1)

D(7,10) E(8,6) F(6,7)
D'(1,10) E'(4,-2) F'(-2,1)

m: 0 $= -8/4 = 2$ $-6/-8 = 3/4$

$y = 10$ $y+2 = 2(x-4)$

$y = 2(x-4)-2$

$2(x-4)-2 = 10$

$2(x-4) = 12$

$(x-4) = 6$

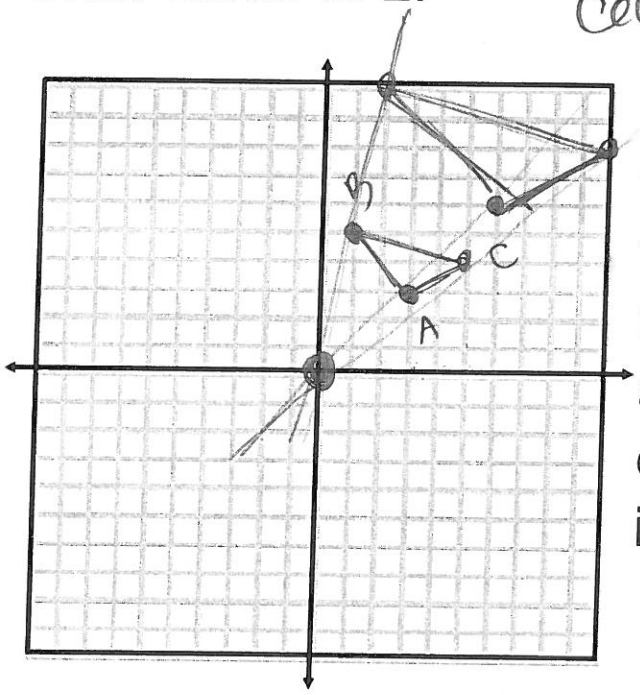
$x = 10$

Center(10,10)

$k = \frac{-9}{-1} = 3$

Recall: Dilate the coordinates of triangle ABC with A(3,3), B(1,5) and C(5,4) using a scale factor of 2.

center (0,0)



Use your straight edge to draw the line through A and A'. Do the same for B and B' and C and C'. Where do these lines intersect?

A(3,3) B(1,5) C(5,4)

A'(6,6) B'(2,10) C'(10,8)

$\frac{3}{3}$ $\frac{5}{1}$ $\frac{4}{5}$

AA' BB'

$y-3=1(x-3)$ $y-10=5(x-2)$

$y=x-3+3$ $y=5(x-2)+10$

$y=x$

$5(x-2)+10=x$

$5x-10+10=x$

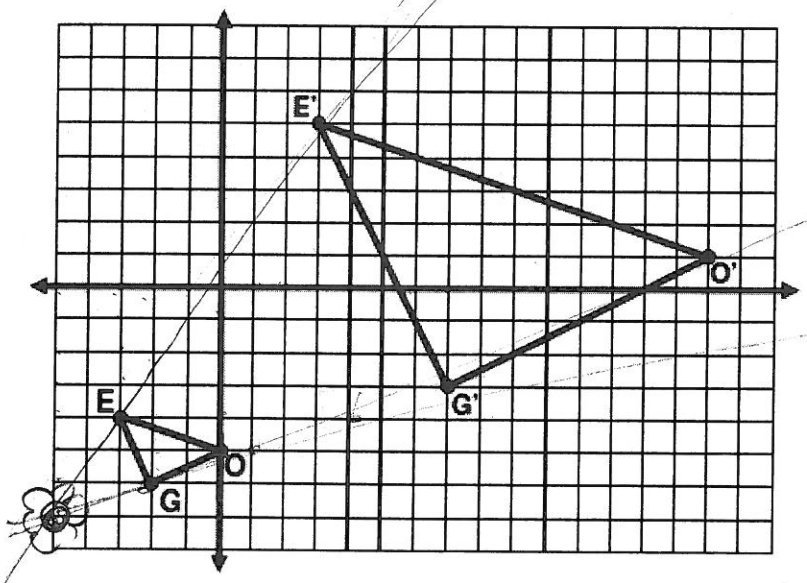
$5x=x$

$x=0$ (0,0)

$y=0$

$k=\frac{6}{3}=2$

Determine the scale factor and the center of dilation given EGO and E'G'O'



$k = 4$

Centr $(-5, -7)$

$k = \frac{8}{2} = 4$

$E(-3,-4)\ G(-2,-6)\ O(0,-5)$

$E'(3,5)\ G'(7,-3)\ O'(15,1)$

$m = \frac{9}{6} = \frac{3}{2} \quad \frac{3}{9} = \frac{1}{3} \quad \frac{6}{15} = \frac{2}{5}$

$y - 5 = \frac{3}{2}(x+3)$

$y - 1 = \frac{2}{5}(x - 15)$

$\frac{3}{2}(x+3) + 5 = \frac{2}{5}(x-15) + 1$ (·10)

$15(x+3) + 50 = 4(x-15) + 10$

$15x + 45 + 50 = 4x - 60 + 10$

$15x + 95 = 4x - 50$

$11x = -55$

$x = -5$

Centr $(-5, -7)$

$\frac{3}{2}(-5+3) + 5$

$\frac{3}{2}(-\frac{4}{3}) + 5 = -7$