

m: How can we dilate figures on the coordinate plane?

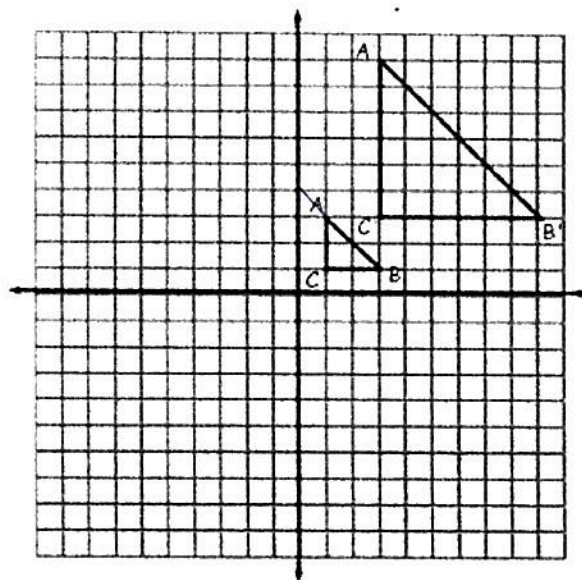


Do Now: $\triangle A'B'C'$ is the image of $\triangle ABC$ after a dilation of scale factor 3 centered at the origin.

1. What are the coordinates of the points below?

A: (1, 3) B: (3, 1) C: (1, 1)

A': (3, 9) B': (9, 3) C': (3, 3)



2. What do you notice about the coordinates?

They were each multiplied by 3.

1. What is the equation of the line that contains AB?

$$y = -x + 4$$

What is the equation of the line that contains A'B'?

$$y = -x + 12$$

$$y = -\frac{3}{8}x + b$$

$$99 = -3 + b$$

$$b = 12$$

How do the equations of the lines compare?

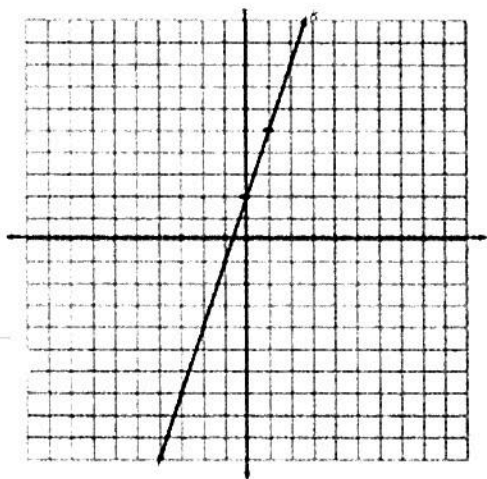
*The slopes are the same.
Lines are parallel.*

★ slope → SAME

★ y-intercept → multiply by SCALE FACTOR

2. What is the equation of line k after

D_3 centered at the origin?

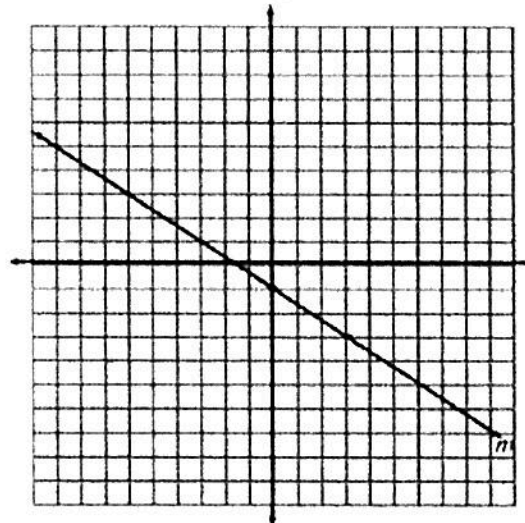


$$y = 3x + 2$$

$$y = 3x + 6$$

3. What is the equation of line m after D_2

centered at the origin?



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

$$y = -\frac{2}{3}x - 2$$

4. What is the equation of the line containing points A' and B' if the line containing points $A(4, 6)$ and $B(-2, 3)$ is dilated by a scale factor of 3 centered at the origin?

$(12, 18)$

$(-6, 9)$

$$\frac{\Delta y}{\Delta x} = \frac{6-3}{4-(-2)} = \frac{3}{6} = \frac{1}{2}$$

$$y = \frac{1}{2}x + b$$

$$y = \frac{1}{2}x + 12$$

$$y - 18 = \frac{1}{2}(x - 12)$$

$$y - 18 = \frac{1}{2}x - 6$$

$$y = \frac{1}{2}x + 12$$

$$6 = \frac{1}{2}(4) + b$$

$$6 = 2 + b$$

$$b = 4$$

5. The triangle ABC has coordinates $A = (6, 1)$, $B = (12, 4)$, and $C = (-6, 2)$. The triangle is dilated from the origin by a scale factor $r = 1/2$. Identify the coordinates of the dilated triangle $A'B'C'$.

$$A' \left(3, \frac{1}{2} \right), B' = (6, 2), C' = (-3, 1)$$

6. Figure $DEFG$ has coordinates $D = (1, 1)$, $E = (7, 3)$, $F = (5, -4)$, and $G = (-1, -4)$. The figure is dilated from the origin by scale factor $r = 7$. Identify the coordinates of the dilated figure $D'E'F'G'$.

$$D' (7, 7) \quad E' = (49, 21) \quad F' (35, -28)$$

7. In the coordinate plane, line m has a slope of 2 and a y-intercept of $(0, -5)$. Line n is the result of dilating line m by a scale factor of 4 with a center of $(0,0)$. What are the slope and y-intercept of line n ?

a. Line n has a slope of $\frac{1}{2}$ and a y-intercept of $(0, -3)$.

b. Line n has a slope of 2 and a y-intercept of $(0, -5)$.

c. Line n has a slope of 2 and a y-intercept of $(0, -20)$.

d. Line n has a slope of 8 and a y-intercept of $(0, 20)$.

$$y + 5 = 2(x - 0)$$

$$y + 5 = 2x$$

$$y = 2x - 5$$

$$y = 2x - 20$$

$$y = mx + b$$

$$-5 = 2(0) + b$$

$$-5 = 0 + b$$

8. Line segment CD with endpoints $C(-5, 16)$ and $D(-20, -4)$ lies in the coordinate plane. The segment will be dilated with a scale factor of 2 and a center at the origin to create $C'D'$. What will be the equation of the line $C'D'$?

$$\frac{\Delta y}{\Delta x} = \frac{-4-16}{-20-(-5)} = \frac{-20}{-15} = \frac{4}{3}$$

$$16 = \frac{4}{3}(-5) + b$$

$$16 = -\frac{20}{3} + b$$

$$\frac{48}{3} = -\frac{20}{3} + b$$