DO NOW

Line segment $A'B'$, whose endpoints are $(4,-2)$ and $(16,14)$, is the image of $\overline{AB}$ after a dilation of $\frac{1}{2}$ centered at the origin. What is the length of $\overline{AB}$?

1) 5
2) 10
3) 20
4) 40

$\sqrt{(4-16)^2+(-2-14)^2}$

$\sqrt{144+256}$

$\sqrt{400}$

$A'B' = 20$

Dilations of a Line on a Graph

If center of dilation is NOT ON THE LINE:

> Parallel to the original
> Dilate other points using center and scale factor given

If center of dilation is ON THE LINE, the image is the SAME LINE

1) The line $y = 2x - 4$ is dilated by a scale factor of $\frac{3}{2}$ and centered at the origin. (0,0) Which equation represents the image of the line after the dilation?

(1) $y = 2x - 4$
(2) $y = 2x - 6$
(3) $y = 3x - 4$
(4) $y = 3x - 6$

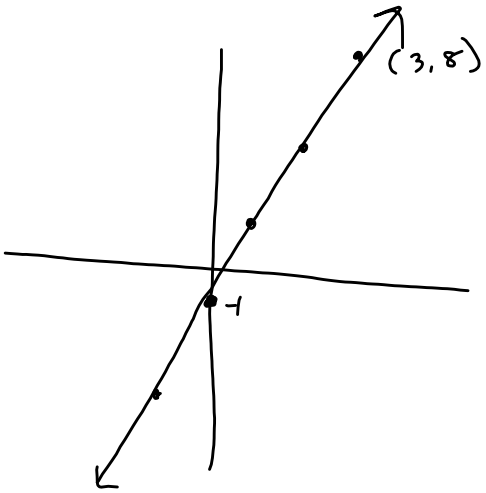
$0 = 2(0) - 4$
$0 \neq -4$

$(0, -4)$
$\times\frac{3}{2}$ $\times\frac{3}{2}$

y-int: $(0, -6)$

2) Line $y = 3x - 1$ is transformed by a dilation with a scale factor of 2 and centered at $(\overset{x}{3}, \overset{y}{8})$. The line's image is

(1) $y = 3x - 8$
(2) $y = 3x - 4$
(3) $y = 3x - 2$
(4) $y = 3x - 1$



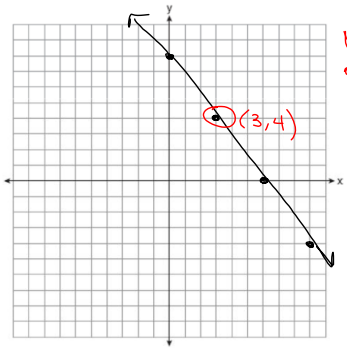
$8 = 3(3) - 1$
$8 = 8$ ✓
Yes

3) Aliyah says that when the line $4x + 3y = 24$ is dilated by a scale factor of 2 centered at the point (3,4), the equation of the dilated line is $y = -\frac{4}{3}x + 16$. Is Aliyah correct? Explain why. [The use of the set of axes below is optional.]

$4x+3y=24$

$3y=-4x+24$

$y=-\frac{4}{3}x+8$



No, since (3,4) is on the line, the equation of the image & original lines will be the same

slope: $\frac{y_2-y_1}{x_2-x_1}$

midpoint: $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

distance: $\sqrt{(x_1-x_2)^2+(y_1-y_2)^2}$

point-slope form: $y-y_1=m(x-x_1)$