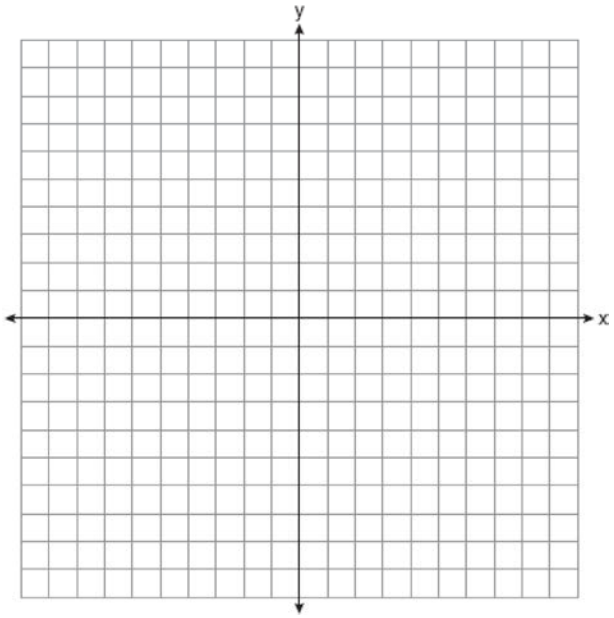
G.SRT.A.1: Line Dilations 3

1 Line ℓ is mapped onto line m by a dilation centered at the origin with a scale factor of 2. The equation of line ℓ is $3x - y = 4$. Determine and state an equation for line m.

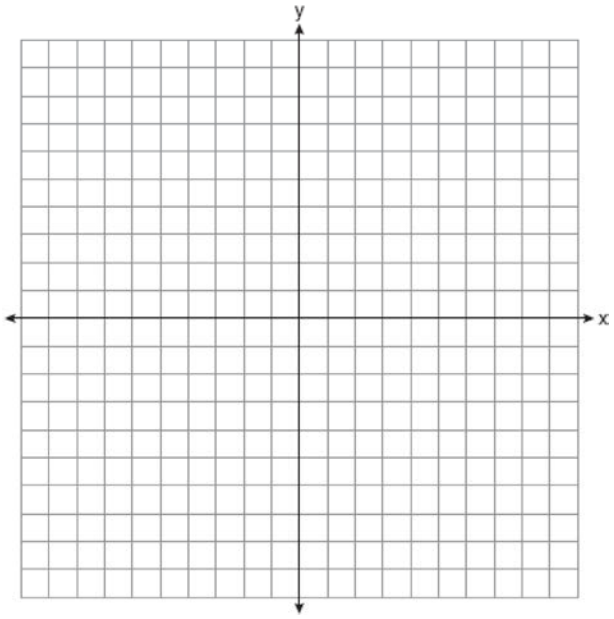
2 Line AB is dilated by a scale factor of 2 centered at point A.

Evan thinks that the dilation of $\overline{AB}$ will result in a line parallel to $\overline{AB}$, not passing through points A or B. Nathan thinks that the dilation of $\overline{AB}$ will result in the same line, $\overline{AB}$. Who is correct? Explain why.

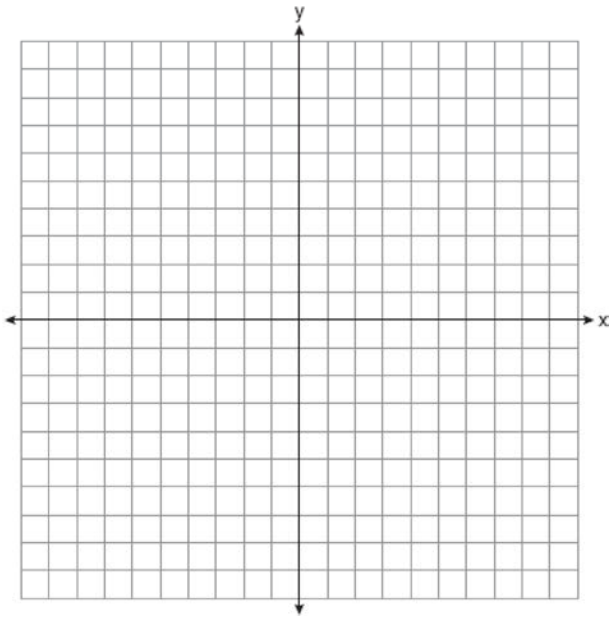
3 The coordinates of the endpoints of $\overline{AB}$ are $A(2,3)$ and $B(5,-1)$. Determine the length of $\overline{A'B'}$, the image of $\overline{AB}$, after a dilation of $\frac{1}{2}$ centered at the origin. [The use of the set of axes below is optional.]



4 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.]



5 Line n is represented by the equation $3x + 4y = 20$. Determine and state the equation of line p, the image of line n, after a dilation of scale factor $\frac{1}{3}$ centered at the point (4,2). [The use of the set of axes below is optional.] Explain your answer.



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Answer Section

1 ANS:
$\ell: y = 3x - 4$

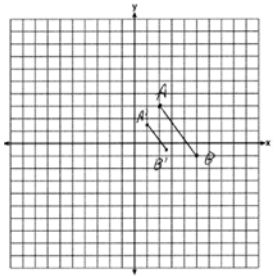
$m: y = 3x - 8$

REF: 011631geo

2 ANS:
Nathan, because a line dilated through a point on the line results in the same line.

REF: 082331geo

3 ANS:



$\sqrt{(2.5-1)^2 + (-.5-1.5)^2} = \sqrt{2.25+4} = 2.5$

REF: 081729geo

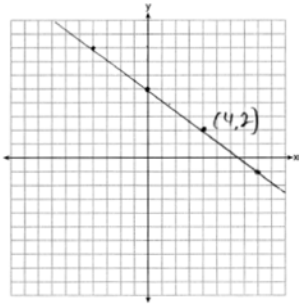
4 ANS:
No, The line $4x + 3y = 24$ passes through the center of dilation, so the dilated line is not distinct.
$4x + 3y = 24$

$3y = -4x + 24$

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

REF: 081830geo

5 ANS:



The line is on the center of dilation, so the line does not change. $p: 3x + 4y = 20$

REF: 061731geo