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Date _____

Geometry

Line Dilations Centered at the Origin

1. The line $y = 2x - 6$ is dilated by a scale factor of 3 and centered at the origin. Write an equation of the line that represents the image of the line after the dilation.

1) $y = 6x - 6$

2) $y = 6x - 18$

3) $y = 2x - 6$

④ $y = 2x - 18$

$m = 2$

$b = 3(-6) = -18$

2. The line $y = \dfrac{1}{2}x - 2$ is dilated by a scale factor of 5 and centered at the origin. Write an equation that represents the image of the line after the dilation.

1) $y = \dfrac{1}{2}x - 2$

② $y = \dfrac{1}{2}x - 10$

3) $y = \dfrac{5}{2}x - 2$

4) $y = \dfrac{5}{2}x - 10$

$m = \dfrac{1}{2}$

$b = 5(-2) = -10$

3. The line $y = 4x - 1$ is dilated by a scale factor of $\dfrac{1}{2}$ and centered at the origin. Write an equation that represents the image of the line after the dilation.

1) $y = 2x - \dfrac{1}{2}$

2) $y = 2x - 1$

③ $y = 4x - \dfrac{1}{2}$

4) $y = 4x - 1$

$m = 4$

$b = \dfrac{1}{2}(-1)$

$b = \dfrac{-1}{2}$

4. The line $y = -2x + 4$ is dilated by a scale factor of $\dfrac{5}{2}$ and centered at the origin. Write an equation that represents the image of the line after the dilation.

1) $y = -2x + 4$

② $y = -2x + 10$

3) $y = -5x + 4$

4) $y = -5x + 10$

$m = -2$

$b = \dfrac{5}{2}(4) = 10$

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

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

$m = 2$

$b = \frac{3}{2}(-4) = -6$

6. The equation of line h is $2x + y = 1$. Line m is the image of line h after a dilation of scale factor 4 with respect to the origin. What is the equation of the line m?

1) $y = -2x + 1$
2) $y = -2x + 4$
3) $y = 2x + 4$
4) $y = 2x + 1$

$\begin{aligned} 2x + y &= 1 \\ -2x &\quad -2x \end{aligned}$
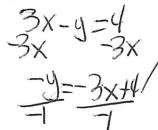
$y = -2x + 1$
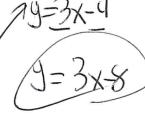
$m = -2$

$b = 4(1) = 4$

7. The equation of line a is given by the equation $y - 3x = 4$. Line b is the image of line a after a dilation with a scale factor of 3 with respect to the origin. Write an equation for line b.

$\begin{aligned} y - 3x &= 4 \\ +3x &\quad +3x \end{aligned}$

$y = 3x + 4$

$m = 3$

$b = 3(4) = 12$
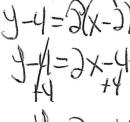
$y = 3x + 12$

8. 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.

$\begin{aligned} 3x - y &= 4 \\ -3x &\quad -3x \end{aligned}$

$\dfrac{-y}{-1} = \dfrac{-3x + 4}{-1}$

$y = 3x - 4$

$m = 3$

$b = 2(-4) = -8$

$y = 3x - 8$

9. Line $y - 4 = 2(x - 2)$ is transformed by a dilation with a scale factor of 4 centered at the origin. What is the equation of the line's image?

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

$y - 4 = 2x - 4$

$\begin{aligned} +4 &\quad +4 \end{aligned}$

$y = 2x + 0$

$m = 2$

$b = 0(4) = 0$

$y = 2x$