

Line Dilations Practice

1. A line segment is parallel dilated by a scale factor of 2 centered at a point not on the line segment. Which statement regarding the relationship between the given line segment and its image is true?

- X 1) The line segments are perpendicular, and the image is one-half of the length of the given line segment.
- X 2) The line segments are perpendicular, and the image is twice the length of the given line segment.
- 3) The line segments are parallel, and the image is twice the length of the given line segment.
- 4) The line segments are parallel, and the image is one-half of the length of the given line segment.

2. A line that passes through the points whose coordinates are (1, 1) and (5, 7) is dilated by a scale factor of 3 and centered at the origin. The image of the line

- 1) is perpendicular to the original line
- 2) is parallel to the original line
- 3) passes through the origin
- 4) is the original line

$$m = \frac{6}{4} = \frac{3}{2}$$

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

$$0 - 1 \neq \frac{3}{2}(0 - 1)$$

$$-1 \neq -\frac{3}{2} \text{ Not the same line}$$

3. The line whose equation is $3x - 5y = 4$ is different y-intercept dilated by a scale factor of $\frac{5}{3}$ centered at the origin. Which statement is correct?

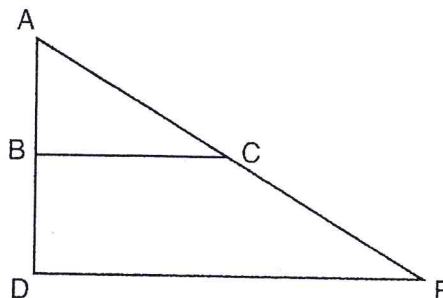
- 1) The image of the line has the same slope as the pre-image but a different y-intercept.
- 2) The image of the line has the same y-intercept as the pre-image but a different slope.
- 3) The image of the line has the same slope and the same y-intercept as the pre-image.
- 4) The image of the line has a different slope and a different y-intercept from the pre-image.

4. The image of $\triangle ABC$ after a dilation of scale factor k centered at point A is $\triangle ADE$, as shown in the diagram below.

Parallel

Which statement is always true?

- 1) $\overline{2AB} = \overline{AD}$
- 2) $\overline{AD} \perp \overline{DE}$
- 3) $\overline{AC} = \overline{CE}$
- 4) $\overline{BC} \parallel \overline{DE}$

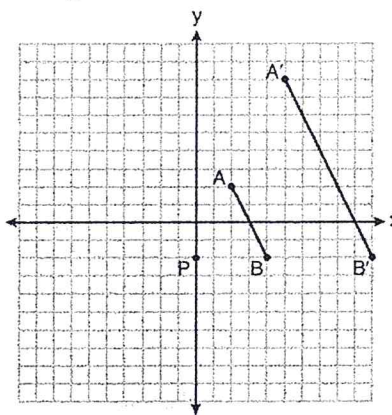


5. On the set of axes below, \overline{AB} is dilated by a scale factor of $\frac{5}{2}$ centered at point P .

parallel

Which statement is always true?

- 1) $\overline{PA} \cong \overline{AA'}$
- 2) $\overline{AB} \parallel \overline{A'B'}$
- 3) $AB = A'B'$
- 4) $\frac{5}{2}(A'B') = AB$



6. The line $3y = -2x + 8$ is transformed by a dilation centered at the origin. Which linear equation could be its image?

- 1) $2x + 3y = 5$
- 2) $2x - 3y = 5$
- 3) $3x + 2y = 5$
- 4) $3x - 2y = 5$

$$\begin{aligned} 3y &= -2x + 8 \\ \frac{3y}{3} &= \frac{-2x + 8}{3} \\ y &= -\frac{2}{3}x + \frac{8}{3} \end{aligned} \rightarrow \begin{aligned} 2x + 3y &= 5 \\ -2x & \quad -2x \\ \hline 3y &= -2x + 5 \\ \frac{3y}{3} &= \frac{-2x + 5}{3} \\ y &= -\frac{2}{3}x + \frac{5}{3} \end{aligned}$$

7. The line represented by the equation $4y = 3x + 7$ is transformed by a dilation centered at the origin. Which linear equation could represent its image?

- 1) $3x - 4y = 9$
- 2) $3x + 4y = 9$
- 3) $4x - 3y = 9$
- 4) $4x + 3y = 9$

$$\begin{aligned} 4y &= 3x + 7 \\ \frac{4y}{4} &= \frac{3x + 7}{4} \\ y &= \frac{3}{4}x + \frac{7}{4} \end{aligned}$$

8. The line $-3x + 4y = 8$ is transformed by a dilation centered at the origin. Which linear equation could represent its image?

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

$$\begin{aligned} -3x + 4y &= 8 \\ +3x & \quad +3x \\ \hline 4y &= 3x + 8 \\ \frac{4y}{4} &= \frac{3x + 8}{4} \\ y &= \frac{3}{4}x + 2 \end{aligned}$$

All we know is that they have the same slope.

9. If the line represented by $y = -\frac{1}{4}x - 2$ is dilated by a scale factor of 4 centered at the origin, which statement about the image is true?

- 1) The slope is $-\frac{1}{4}$ and the y -intercept is -8 .
- 2) The slope is $-\frac{1}{4}$ and the y -intercept is -2 .
- 3) The slope is -1 and the y -intercept is -8 .
- 4) The slope is -1 and the y -intercept is -2 .

$$m = -\frac{1}{4}$$

multiply scale factor and b

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

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

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

xy on the line?
 $8 = 3(3) - 1$
 $8 = 8 \checkmark$

Same y intercept

11. 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) $y = 3x - 6$

$$m = 2$$

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

$$y = 2x - 6$$

multiply scale factor and b .

12. Line MN is dilated by a scale factor of 2 centered at the point $(0, 6)$. If MN is represented by $y = -3x + 6$, which equation can represent $M'N'$, the image of MN ?

- 1) $y = -3x + 12$
- 2) $y = -3x + 6$
- 3) $y = -6x + 12$
- 4) $y = -6x + 6$

$$y = -3x + 6$$

$$b = -3(0) + 6$$

$$b = 6 \checkmark$$

same b

xy on the line?

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

$$y - 2x = 4$$

$$+2x + 2x$$

$$y = 2x + 4$$

$$m = 2$$

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

$$y = 2x + 8$$

multiply scale factor and b .

$$2(3) + 2(0) = 6 \text{ Same } b.$$

14. The equation of a line is given by the equation $2x + 2y = 6$. Write an equation for the image of the line after a dilation of 2 centered at $(3, 0)$ ^{on the line?}

$$2x + 2y = 6$$

15. The equation of line l is $y + 2x = 1$. Line m is the image of line l after a dilation of 3 centered at the origin. What is the equation of line m .

multiply scale factor and b.

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

$$m = -2$$

$$b = 3(1) = 3$$

$$y = -2x + 3$$

16. 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 $(4, 2)$ ^{on the line?}. [The use of the set of axes below is optional.] Explain your answer.

$3x + 4y = 20$ the center of dilation is on the line so the image is the same line.

$$\begin{aligned} 3x + 4y &= 20 \\ 3(4) + 4(2) &= 20 \\ 20 &= 20 \checkmark \\ \text{Same } b. \end{aligned}$$

17. Aliyah says that when the line $4x + 3y = 24$ is dilated by a scale factor of 2 centered at the point $(3, 4)$ ^{on the line?}, 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.]

on the line?

$$4x + 3y = 24$$

$$4(3) + 3(4) = 24$$

$$24 = 24 \checkmark$$

same y-intercept

$$\begin{aligned} 4x + 3y &= 24 \\ -4x & \quad -4x \end{aligned}$$

$$\frac{3y}{3} = \frac{-4x + 24}{3}$$

$$y = -\frac{4}{3}x + 8 \neq y = -\frac{4}{3}x + 16$$

No, since the center of dilation is on the line, the image is the same line.