LESSON MAKER PRO

Dilation Line Lab

Test how lines behave under a dilation.

HIGH SCHOOL · GEO-G.SRT.1.a

GEO-G.SRT.1.a "Verify experimentally that dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged."

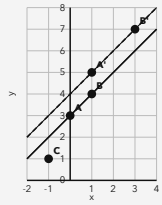
NAME _____ DATE _____

TRACK THE LINE

A dilation sends each point along a ray from the center. A line through the center stays on itself. A line away from the center maps to a parallel line, so the slopes match.

WORKED EXAMPLE

The grid shows line AB and its image A'B' after a dilation centered at C with scale factor 2. Verify the line relationship.



1. Find m(AB): (4 - 3)/(1 - 0) = 1.
2. Find m(A'B'): (7 - 5)/(3 - 1) = 1.
3. The equal slopes show the two lines are parallel.

Answer: m(AB) = 1 and m(A'B') = 1, so A'B' is parallel to AB.

PRACTICE 4 problems

1 A dilation has center (4, -3) and scale factor 2. It maps y = 5x + 7 to a new line. Find the image equation and its relationship to the original line.

ANSWER _____

2 A dilation centered at (3, -5) has scale factor -2. What is the image of the line y = 4x - 17?

ANSWER _____

3 A dilation centered at (1, 6) has scale factor 3. It maps P(-1, 2) to P'(-5, -6) and Q(2, 5) to Q'(4, 3). Find both slopes and state the line relationship.

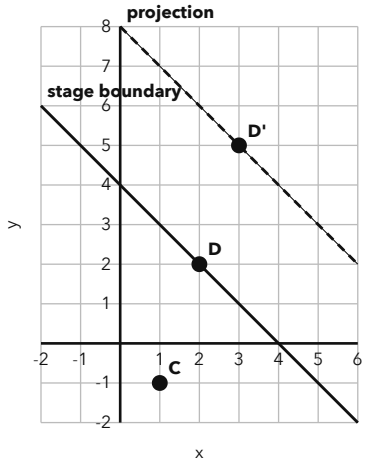
ANSWER _____

4 A dilation centered at (-4, 2) has scale factor 1/2. Which line is unchanged: y = -2x - 6 or y = -2x + 1?

ANSWER _____

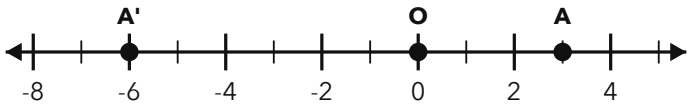
APPLY IT Show your work

1 A concert app projects the solid stage boundary onto the dashed boundary. The grid shows a dilation centered at C with scale factor 2. Find both slopes and state the relationship.



ANSWER _____

2 A drone follows a straight rail through control point O. The number line shows point A and its image A' after a dilation centered at O with scale factor -2. Does the rail become a different parallel rail, or does it stay the same line?



ANSWER _____

CHALLENGE One step up

A dilation with scale factor 3 maps y = 2x - 1 to y = 2x + 5. Find all possible centers C(a, b). Explain why the center cannot be on the original line.

WORK SPACE AND ANSWER

ANSWER KEY

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HIGH SCHOOL · GEO-G.SRT.1.a

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A dilation has center (4, -3) and scale factor 2. It maps y = 5x + 7 to a new line. Find the image equation and its relationship to the original line.	**y = 5x + 37; the image line is parallel to the original line.**
2	A dilation centered at (3, -5) has scale factor -2. What is the image of the line y = 4x - 17?	**y = 4x - 17**
3	A dilation centered at (1, 6) has scale factor 3. It maps P(-1, 2) to P'(-5, -6) and Q(2, 5) to Q'(4, 3). Find both slopes and state the line relationship.	**m(PQ) = 1 and m(P'Q') = 1; P'Q' is parallel to PQ.**
4	A dilation centered at (-4, 2) has scale factor 1/2. Which line is unchanged: y = -2x - 6 or y = -2x + 1?	**y = -2x - 6**

PART 2 · APPLY IT

1. **Both slopes are -1, so the projected boundary is parallel to the stage boundary.** Read a slope of -1 from each line. The solid line does not pass through C, so its image is a parallel line.
2. **The rail stays the same line through O.** A and A' lie on the same straight line as O. A dilation leaves every line through its center unchanged.

CHALLENGE

All possible centers satisfy b = 2a - 4. This line is parallel to y = 2x - 1, so no possible center lies on the original line.

Accept equivalent equation forms, such as 5x - y + 37 = 0. For slope work, accept a correct rise-over-run calculation and the conclusion that equal slopes show parallel lines.