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."

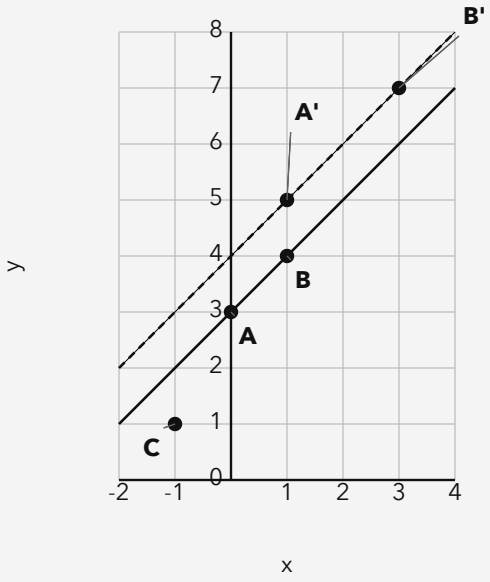
NAME _____ DATE _____

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 _____

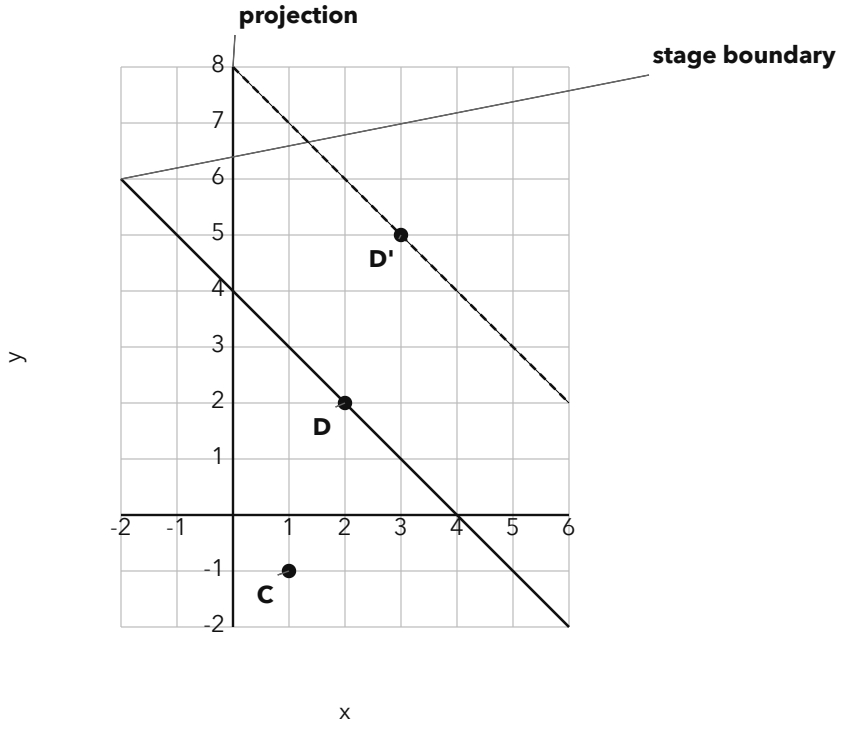
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4 A dilation centered at (-4, 2) has scale factor 1/2. Which line is unchanged: y = -2x - 6 or y = -2x + 1?

ANSWER _____

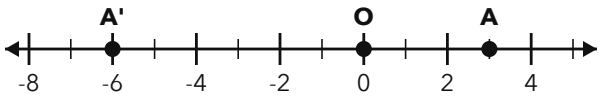
APPLY IT Show your work

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.



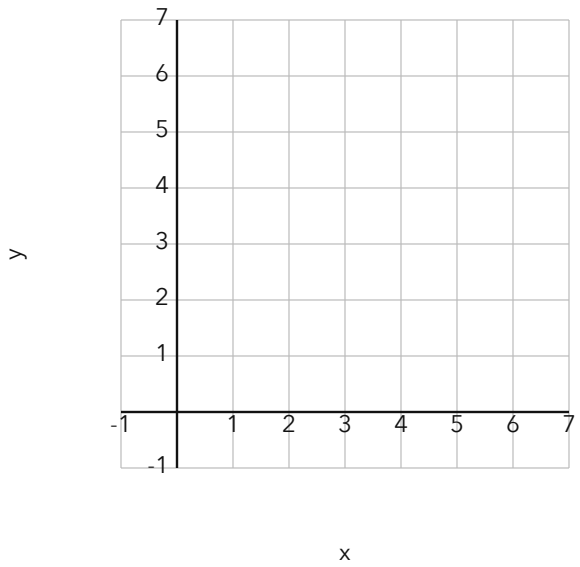
ANSWER _____

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 _____

3 Experiment on the blank grid: mark center O(0,0). Draw line AB through A(0,1) and B(2,3). Construct its dilation with scale factor 2 by drawing rays from O through A and B and placing each image point twice as far from O. Draw the image line. Count rise/run on both lines and record the observed slopes; explain their relationship. Repeat for line DE through D(1,1) and E(2,2), using the same center and factor. Extend the original and image lines and describe what happens when the original line contains the center. Show your actual constructions, not just calculated coordinates.



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 # Dilation Line Lab

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.
3. **A′(0,2), B′(4,6): original and image slopes both 1, with different intercepts 1 and 2, so distinct parallel lines. D′(2,2), E′(4,4): both original and image lie on y=x, the same line through O.** Check the actual rays, original points and image points at twice the center distance. AB rise/run=2/2=1; A′B′=4/4=1. DE=1/1=1 and D′E′=2/2=1. The first lines are distinct; the second lines coincide. Learner observations and constructions are required.

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. For the experiment, inspect the learner's actual dilation construction and recorded observations or measurements, not just the numerical answer.