2.5 Dilating Lines
Objective: Dilate a line. Duh.

How to Dilate a Line
Line \( y = 2x + 2 \) is transformed by a dilation with a scale factor of 3 and centered at the origin. What is the equation of the line after the dilation?

Step 1) Draw the given Line

Step 2) Dilate ANY point on the line from the center of dilation

\[
\text{Point}
\]

Step 3) Write the equation of the new line

\[
y = mx + b
\]

\[
m = \quad ( \quad ) = ( \quad ) ( \quad ) + b
\]

Solve for me

Line \( y = 3x - 2 \) is transformed by a dilation with a scale factor of 2 and centered at the origin. What is the equation of the line after the dilation?

Step 1) Draw the given Line

Step 2) Dilate ANY point on the line from the center of dilation

\[
\text{Point}
\]

Step 3) Write the equation of the new line

\[
y = mx + b
\]

\[
m = \quad ( \quad ) = ( \quad ) ( \quad ) + b
\]

Solve for me
Line \( y = 2x + 1 \) is transformed by a dilation with a scale factor of 2 and centered at the (3,2). What is the equation of the lines image?

Line \( 2x - 3y = 6 \) is transformed by a dilation with a scale factor of 2 and centered at \( P(3,0) \). What is the equation of the line after the dilation?
**Independent Practice**

Line \( \ell \) has the equation \( y = 4x - 2 \). Write the equation of the image of \( \ell \) after a dilation with a scale factor of 2, centered at the origin.

1. **Step 1:** Draw the given line.
2. **Step 2:** Dilate ANY point on the line from the center of dilation.

   ![Point](image)

3. **Step 3:** Write the equation of the new line.

   \[
   y = mx + b \\
   \text{Point}
   \]

   ![Point](image)

   \[
   y = mx + b \\
   \text{Point}
   \]

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Line \( y = \frac{1}{2}x + 2 \) is transformed by a dilation with a scale factor of 3 and centered at the \((3,1)\). What is the equation of the line's image?

1. **Step 1:** Draw the given line.
2. **Step 2:** Dilate ANY point on the line from the center of dilation.

   ![Point](image)

3. **Step 3:** Write the equation of the new line.

   \[
   y = mx + b \\
   \text{Point}
   \]

   ![Point](image)

   \[
   y = mx + b \\
   \text{Point}
   \]
Line $2x + 3y = -6$ is transformed by a dilation with a scale factor of 3 and centered at the point (-3, -1). What is the equation of the line after the dilation?

Line $5x - 2y = 4$ is transformed by a dilation with a scale factor of 2 and centered at the point (2, 3). What is the equation of the line after the dilation?