

Dilations & Scale Factor

Name: _____ Date: _____

LEARNING OBJECTIVE

Students will dilate a figure on the coordinate plane using a given scale factor and explain the relationship between scale factor and side length/area.

MATERIALS NEEDED

- graph paper
- ruler
- pencil
- colored pencils
- calculator (optional)

HANDS-ON ACTIVITY

1. On graph paper, plot triangle GHI at G(1,1), H(3,1), I(1,4) and connect the points in blue. Measure and record the length of each side using your ruler.
2. Apply a dilation with center at the origin and scale factor 3: multiply each coordinate of G, H, and I by 3 to find G', H', I'.
3. Plot triangle G'H'I' in red and measure each of its side lengths with your ruler.
4. Calculate the ratio of each new side length to its original side length (e.g., $G'H' / GH$) and confirm all three ratios equal the scale factor, 3.
5. Calculate the area of both triangles ($\text{Area} = 1/2 \times \text{base} \times \text{height}$) and find the ratio of the areas. Compare this ratio to the scale factor.

QUESTIONS

1. What are the coordinates of G', H', and I' after a dilation with scale factor 3 centered at the origin?
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2. What was the ratio of each new side length to the original side length, and does that match the scale factor?
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3. The original triangle's area and the dilated triangle's area -- what is the ratio between them, and how does it relate to the scale factor?

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4. If the scale factor had been $\frac{1}{2}$ instead of 3, what would happen to the triangle's size, and is it still similar to the original?
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