11.1 Dilations ⤳ larger ↘ smaller

Essential Question: How does a dilation transform a figure?

🧭 Explore 1 Investigating Properties of Dilations

A **dilation** is a transformation that can change the size of a polygon but leaves the shape unchanged. A dilation has a *center of dilation* and a *scale factor* which together determine the position and size of the image of a figure after the dilation.

Use $\triangle ABC$ and its image $\triangle A'B'C'$ after a dilation to answer the following questions.

Pre-Image ... *Image* → prime
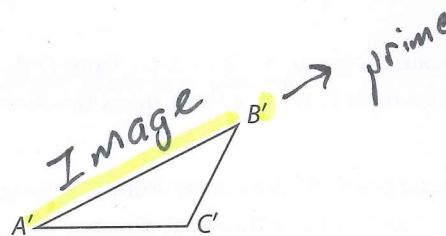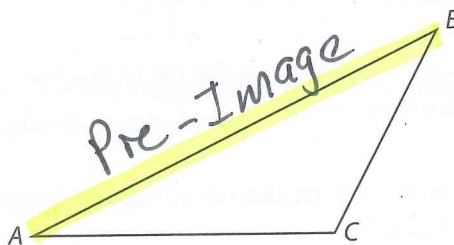
(A) Use a ruler to measure the following lengths. Measure to the nearest tenth of a centimeter.

$AB = $ **6.0** cm $A'B' = $ **3.0** cm

$AC = $ **4.0** cm $A'C' = $ **2.0** cm

$BC = $ **3.0** cm $B'C' = $ **1.5** cm

(B) Use a protractor to measure the corresponding angles.

$m\angle A = $ **22°** $m\angle A' = $ **22°**

$m\angle B = $ **33°** $m\angle B' = $ **33°**

$m\angle C = $ **125°** $m\angle C' = $ **125°**

(C) Complete the following ratios

$$\frac{A'B'}{AB} = \frac{3.0}{6.0} = \frac{1}{2} \qquad \frac{A'C'}{AC} = \frac{2.0}{4.0} = \frac{1}{2} \qquad \frac{B'C'}{BC} = \frac{1.5}{3.0} = \frac{1}{2}$$

→ Scale Factor

Reflect

1. What do you notice about the corresponding sides of the figures? What do you notice about the corresponding angles?

   Ratios (fractions) of lengths are equal. and corresp. angles.

2. **Discussion** What similarities are there between reflections, translations, rotations, and dilations? What is the difference?

   Angle/Length are preserved

   Only Angle Measure preserved

11. Essential Question Check-In In general how does a dilation transform a figure?
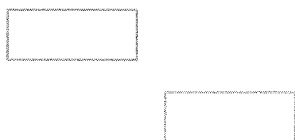
_____

_____

1. Consider the definition of a dilation. A dilation is a transformation that can change the size of a polygon but leaves the shape unchanged. In a dilation, how are the ratios of the measures of the corresponding sides related?

Tell whether one figure appears to be a dilation of the other figure Explain.
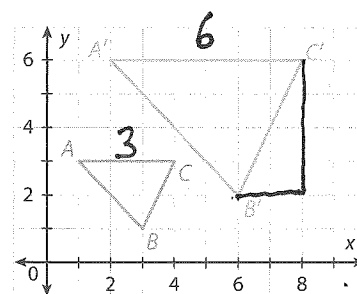
2.

3.

4. Is the scale factor of the dilation of $\triangle ABC$ equal to $\frac{1}{2}$? Explain.

$\frac{6}{3} = 2$ No, the scale factor is 2, not $\frac{1}{2}$

✓

5. Square A is a dilation of square B.
What is the scale factor?

   a. $\frac{1}{7}$

   b. $\frac{4}{5}$

   c. $\frac{5}{4}$

   d. 7

   e. $\frac{25}{16}$

35

A

B

28