Sec 2.3 Geometry – Dilations

[Example Dilation]: Dilate the □ABCD by a factor of 2.0 from point E.

1. Dilate the △ABC by a factor of \( \frac{3}{2} \) from point D.

   a. Measure the length of \( \overline{AB} \) in centimeters to the nearest tenth.

   \[ \text{AB} = \text{__________} \]

   b. Measure the length of \( \overline{A'B'} \) in centimeters to the nearest tenth.

   \[ \text{A'B'} = \text{__________} \]

   c. Determine the value of \( \frac{A'B'}{AB} \) divided by \( AB \).

   \[ \frac{A'B'}{AB} = \text{__________} \]

   d. What might you conclude about the scale factor and the ratio of dilated segment measure to its pre-image?

   

   e. Measure angle \( \angle BAC \) and the angle \( \angle B'A'C' \) using a protractor.

   \[ m\angle BAC = \text{__________} \]

   \[ m\angle B'A'C' = \text{__________} \]

   f. What might you conclude about each pair of corresponding angles?
2. Consider the following picture in which □BCDE has been dilated from point A.

![Image of a dilated rectangle with labeled vertices A, B, C, D, E, E', B', C', D', E']

a. What is the scale factor of the dilation based on the sides?

b. What is the area of □BCDE?

c. What is the area of □B'C'D'E'?

d. What is the value of the area of □B'C'D'E' divided by area of □BCDE?

e. What might you conclude about the ratio of two dilated shapes sides compared to the ratio of their areas?

3. Dilate the line \( \overline{AB} \) by a factor of 0.5 from point C.

![Image of a dilated line segment with labeled points A, B, and C]

How could you characterize the lines \( \overline{AB} \) and \( \overline{A'B'} \)?
4. Dilate the line $\overline{AB}$ by a factor of 2.2 from point C.

How could you characterize the lines $\overline{AB}$ and $\overline{A'B'}$?

5. Consider the following picture in which rectangular prism A has been dilated from point G.

a. What is the scale factor of the dilation based on the sides?

b. What is the volume of rectangular prism A?

c. What is the volume of rectangular prism A’?

_________  ___________  ___________

d. What is the value of the volume of prism A’ divided by volume of prism A? __________

e. What might you conclude about the ratio of two dilated solids sides compared to the ratio of their volumes? _____________________________

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1. Plot the following points and connect the consecutive points.

   A(5,1)   H(6,4)   O(2,7)
   B(8,2)   I(5,6)   P(3,8)
   C(9,3)   J(6,5)   Q(1,7)
   D(9,7)   K(5,7)   R(1,3)
   E(7,8)   L(4,6)   S(2,2)
   F(8,7)   M(4,4)   A(5,1)
   G(7,5)   N(3,5)

2. First use the dilation rule \(D: (x, y) \rightarrow (0.5x, 0.5y)\) using the points from the previous problem, plot the newly created points, and connect the consecutive points.

   A'(   )   H'(   )   O'(   )
   B'(   )   I'(   )   P'(   )
   C'(   )   J'(   )   Q'(   )
   D'(   )   K'(   )   R'(   )
   E'(   )   L'(   )   S'(   )
   F'(   )   M'(   )   A'(   )
   G'(   )   N'(   )

3. What would happen with the rule: \(D: (x, y) \rightarrow (3x, 3y)\)?

4. What would happen with the rule: \(D: (x, y) \rightarrow (0.5x, 1y)\)?

5. What would happen with the rule: \(R: (x, y) \rightarrow (-1x, 1y)\)?

6. What would happen with the rule: \(R: (x, y) \rightarrow (1x, -1y)\)?
7. Figure FCDE has been dilated to create F’C’D’E’.
   a. What is the dilation scale factor?

   b. What is the location of the center of dilation?

   c. What is the ratio of the areas?

8. Which point would be the center of dilation?

9. The different sizes of soft drink cups at a movie theater are created by using dilations. If the large is 8 inches tall and the medium is 6 inches tall, answer the following.
   a. What is the scale factor of the dilation from a large to a medium drink?

   b. What is the ratio of the volumes of the two drinks?

   c. If the large holds 30 ounces, how much does the medium hold?