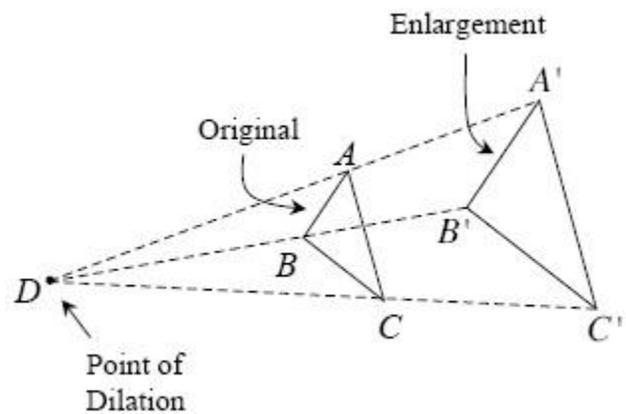


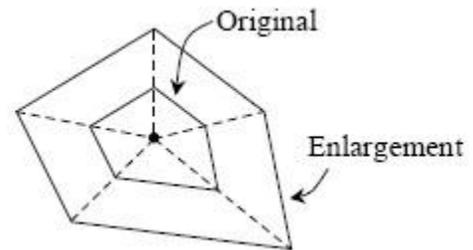
Dilations

The transformations you studied in Chapter 1 (translations, rotations, and reflections) are called rigid transformations because they all maintain the size and shape of the original figure.

However, a **dilation** is a transformation that maintains the shape of a figure but multiplies its dimensions by a chosen factor. In a dilation, a shape is stretched proportionally from a particular point, called the **point of dilation** or **stretch point**. For example, in the diagram at right, $\triangle ABC$ is dilated to form $\triangle A'B'C'$. Notice that while a dilation changes the size and location of the original figure, it does not rotate or reflect the original.



Note that if the point of dilation is located inside a shape, the enlargement encloses the original, as shown below right.



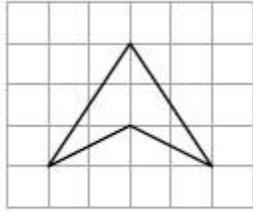
3-5. Plot the rectangle $ABCD$ formed with the points $A(-1, -2)$, $B(3, -2)$, $C(3, 1)$, and $D(-1, 1)$ onto graph paper. Use the method used in problem 3-2 to enlarge it from the origin by a factor of 3. Label this new rectangle $A'B'C'D'$.

- What are the dimensions of the enlarged rectangle, $A'B'C'D'$?
- Find the area and the perimeter of $A'B'C'D'$.
- Find AC (the length of \overline{AC}).

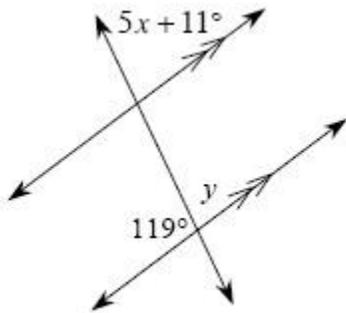
3-8. On graph paper, graph line \overline{MU} if $M(-1, 1)$ and $U(4, 5)$.

- Find the slope of \overline{MU} .
- Find MU (the distance from M to U).
- Are there any similarities to the calculations used in parts (a) and (b)? Any differences?

3-17. Enlarge the shape below on graph paper using a zoom factor of 4.



3-20. Examine the relationships in the diagram below. Then solve for x and y , if possible.



Advanced Extension:

3-19. The temperature in San Antonio, Texas is currently 77°F and is increasing by 3° per hour. The current temperature in Bombay, India is 92°F and the temperature is dropping by 2° per hour. When will it be as hot in San Antonio as it is in Bombay? What will the temperature be?