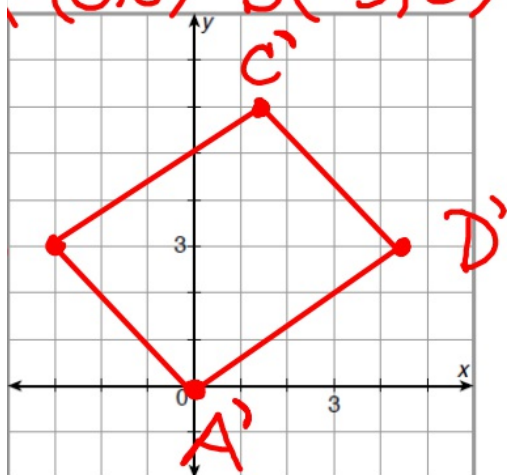
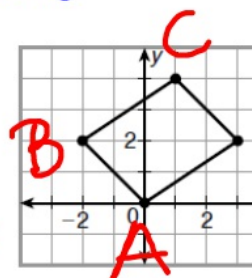


P. 15 - Similarity in the Plane

A jeweler designs a setting that can hold a gem in the shape of a parallelogram. The figure shows the outline of the gem. The client, however, wants a gem and setting that is slightly larger.

$$A(0,0) \quad B(-2,2) \quad C(1,4) \quad D(3,2)$$

$$A'(0,0) \quad B'(-3,3) \quad C'(1.5,6) \quad D'(4.5,3)$$



Similar:

- ① Congruent Angles
- ② Sides Proportional

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Draw the gem after a dilation with a scale factor of $\frac{3}{2}$.

$$\frac{A'B'}{AB} = \frac{B'C'}{BC} = \frac{C'D'}{CD} = \frac{D'A'}{DA}$$

$$\frac{A'B'}{AB} = \frac{\begin{matrix} A(0,0) & B'(-3,3) \\ x_1 y_1 & x_2 y_2 \end{matrix}}{\begin{matrix} A(0,0) & B(-2,2) \\ x_1 y_1 & x_2 y_2 \end{matrix}} = \frac{\sqrt{(-3-0)^2 + (3-0)^2}}{\sqrt{(-2-0)^2 + (2-0)^2}}$$

$$\frac{A'B'}{AB} = \frac{\sqrt{18}}{\sqrt{8}} = \frac{4.2}{2.8} = \boxed{1.5}$$

$$\frac{B'C'}{BC} = \frac{5.4}{3.6} = \boxed{1.5}$$