

# **Chapter 9 § 5**

## ***Dilations***

### **Definitions:**

**Dilation – a transformation that may change the size of a figure.**

**Similarity transformation – dilations produce similar figures**

### **Theorems:**

**( 9 – 1 ) – If a dilation with center C and a scale factor of r transforms A to E and B to D, then  $ED = | r | (AB)$ .**

**( 9 – 2 ) – If  $P( x, y )$  is the preimage of a dilation centered at the origin with a scale factor r, then the image is  $P'( x, ry )$ .**

**Find the measure of the dilation image A'B' or the preimage AB using the given scale factor.**

$$AB = 12, r = -2$$

$$A'B' = 36, r = \frac{1}{4}$$

$$A'B' = |r| (AB)$$

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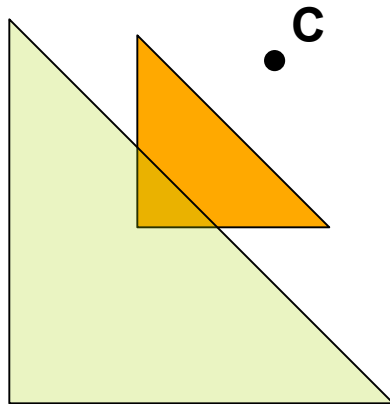
$$A'B' = |-2| (12)$$

$$36 = \frac{1}{4} (AB)$$

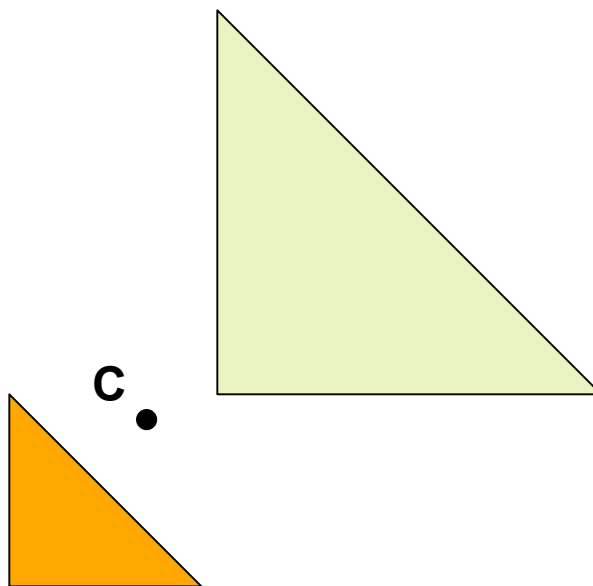
$$A'B' = 24$$

$$144 = AB$$

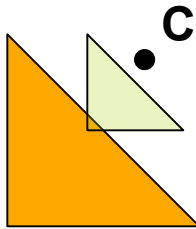
**Draw the dilation image of  $\Delta ABC$  with center  $C$  and  $r = 2$**



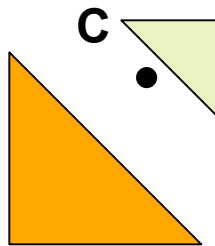
**Draw the dilation image of  $\Delta ABC$  with center  $C$  and  $r = -2$**



Draw the dilation image of  $\Delta ABC$  with center  $C$  and  $r = \frac{1}{2}$



Draw the dilation image of  $\Delta ABC$  with center  $C$  and  $r = -\frac{1}{2}$



**Find the image of each polygon, given the vertices, after a dilation centered at the origin with a scale factor of 2.**

$$(x, y) \rightarrow (2x, 2y)$$

$$A (-2, 1), B (-1, 3), C (2, -3)$$

$$A' (-4, 2), B' (-2, 6), C' (4, -6)$$

**Find the image of each polygon, given the vertices, after a dilation centered at the origin with a scale factor of  $\frac{1}{2}$ .**

$$(x, y) \rightarrow \left(\frac{1}{2}x, \frac{1}{2}y\right)$$

$$A (-2, 1), B (-1, 3), C (2, -3)$$

$$A' (-1, .5), B' (-.5, 1.5), C' (1, -1.5)$$