

**9-5**

**Study Guide and Intervention**

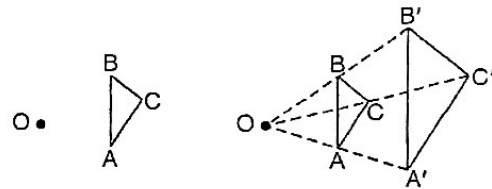
*Dilations Notes*

**Classify Dilations** A dilation is a transformation in which the image may be a different size than the preimage. A dilation requires a center point and a scale factor,  $r$ .

Let  $r$  represent the scale factor of a dilation.  
 If  $|r| > 1$ , then the dilation is an enlargement.  
 If  $|r| = 1$ , then the dilation is a congruence transformation.  
 If  $0 < |r| < 1$ , then the dilation is a reduction.

**Example** Draw the dilation image of  $\triangle ABC$  with center  $O$  and  $r = 2$ .

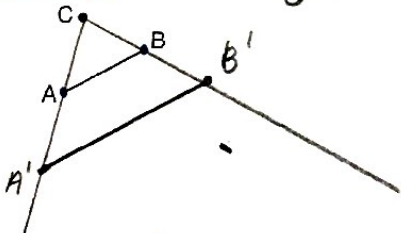
Draw  $\overline{OA}$ ,  $\overline{OB}$ , and  $\overline{OC}$ . Label points  $A'$ ,  $B'$ , and  $C'$  so that  $OA' = 2(OA)$ ,  $OB' = 2(OB)$ , and  $OC' = 2(OC)$ .  $\triangle A'B'C'$  is a dilation of  $\triangle ABC$ .



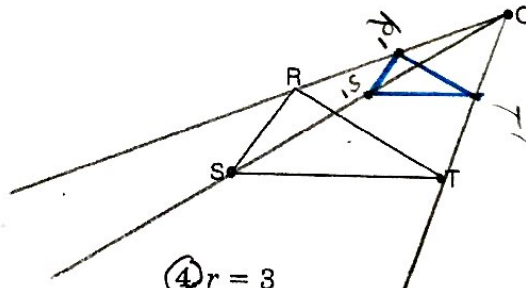
**Exercises**

Draw the dilation image of each figure with center  $C$  and the given scale factor. Describe each transformation as an *enlargement*, *congruence*, or *reduction*.

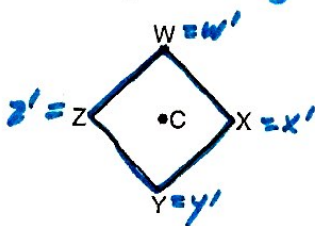
1.  $r = 2$  enlargement



2.  $r = \frac{1}{2}$  reduction



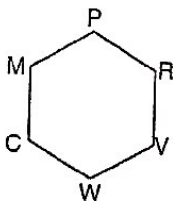
3.  $r = 1$  Congruence



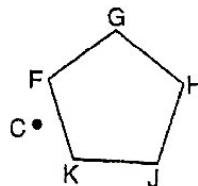
4.  $r = 3$



5.  $r = \frac{2}{3}$



6.  $r = 1$



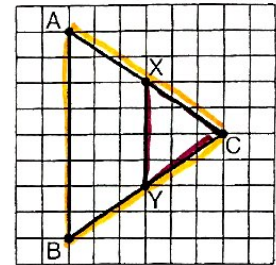
# 9-5 Study Guide and Intervention (continued)

## Dilations

**Identify the Scale Factor** If you know corresponding measurements for a preimage and its dilation image, you can find the scale factor.

**Example** Determine the scale factor for the dilation of  $\overline{XY}$  to  $\overline{AB}$ . Determine whether the dilation is an *enlargement*, *reduction*, or *congruence transformation*.

$$\begin{aligned} \text{scale factor} &= \frac{\text{image length}}{\text{preimage length}} = \frac{\text{new}}{\text{original}} \\ &= \frac{8 \text{ units}}{4 \text{ units}} \\ &= 2 \end{aligned}$$

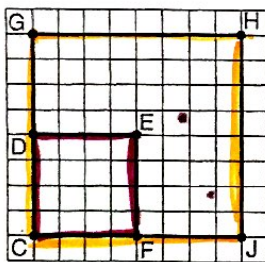


The scale factor is greater than 1, so the dilation is an enlargement.

### Exercises

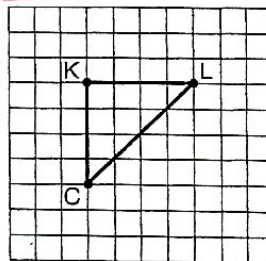
Determine the scale factor for each dilation with center C. Determine whether the dilation is an *enlargement*, *reduction*, or *congruence transformation*.

1.  $\overline{CGHJ}$  is a dilation image of  $\overline{CDEF}$ .



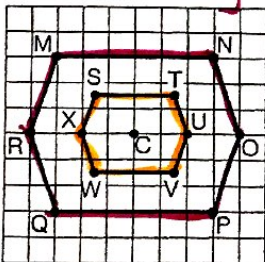
*new*  
 $SF = \frac{\text{new}}{\text{orig.}} = \frac{8}{4} = 2$   
*enlargement*

2.  $\triangle CKL$  is a dilation image of  $\triangle CKL$ .



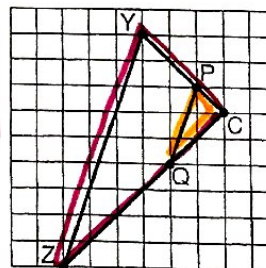
*S.F. = 1*  
*congruence*

3.  $STUVWX$  is a dilation image of  $MNOPQR$ .



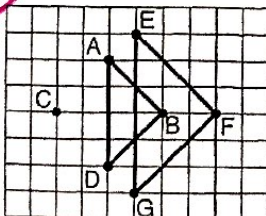
*new*  
 $SF = \frac{\text{new}}{\text{orig.}} = \frac{3}{6} = \frac{1}{2}$   
*reduction*

4.  $\triangle CPQ$  is a dilation image of  $\triangle CYZ$ .



$SF = \frac{\text{new}}{\text{orig.}} = \frac{1}{3}$   
*reduction*

5.  $\triangle EFG$  is a dilation image of  $\triangle ABC$ .



6.  $\triangle HJK$  is a dilation image of  $\triangle HJK$ .

