

9-5 Study Guide and Intervention

Dilations

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 .

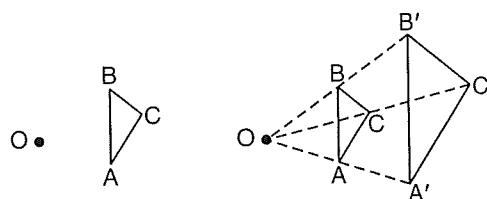
(SLR)

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.

→ same shape, just moved

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

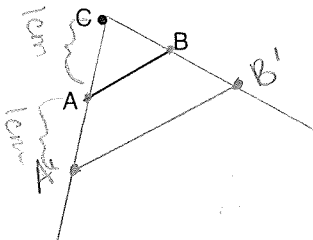
Draw \overline{OA} , \overline{OB} , and \overline{OC} . Label points A' , B' , and C' so that $OA' = 2(OA)$, $OB' = 2(OB)$, and $OC' = 2(OC)$. $\triangle A'B'C'$ is a dilation of $\triangle ABC$.



Exercises

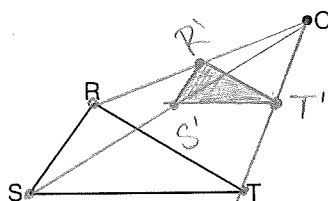
Draw the dilation image of each figure with center C and the given scale factor. Describe each transformation as an *enlargement*, *congruence*, or *reduction*.

1. $r = 2$ $|2| > 1 \therefore$ enlargement



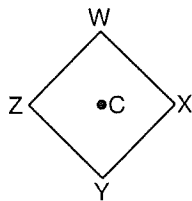
$A' = 2A$
 $B' = 2B$

2. $r = \frac{1}{2}$ $|\frac{1}{2}| < 1 \therefore$ reduction

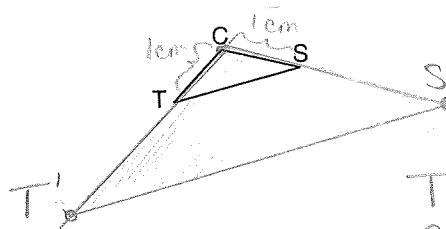


$R' = \frac{1}{2}(R)$
 $S' = \frac{1}{2}(S)$
 $T' = \frac{1}{2}(T)$

3. $r = 1$ $|1| = 1 \therefore$ congruence



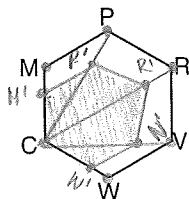
4. $r = 3$ $|3| > 1 \therefore$ enlargement



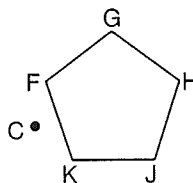
$C' = C$ since C is the center

$T' = 3T$
 $S' = 3S$

5. $r = \frac{2}{3}$ $|\frac{2}{3}| < 1 \therefore$ reduction



6. $r = 1$ $|1| = 1 \therefore$ congruence



9-5

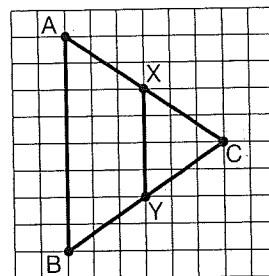
Study Guide and Intervention (continued)

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*.

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

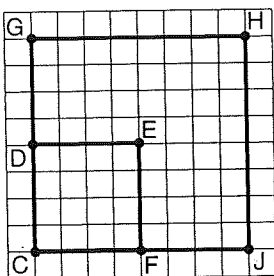


The scale factor is greater than 1, so the dilation is an enlargement.

Exercises

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

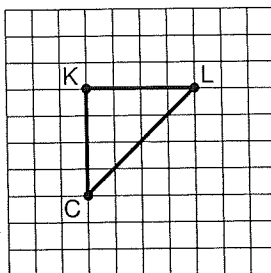
1. $CGHJ$ is a dilation image of $CDEF$.



$$\frac{CGHJ}{CDEF} = \frac{4}{2} = 2$$

$|2| > 1 \therefore$ enlargement

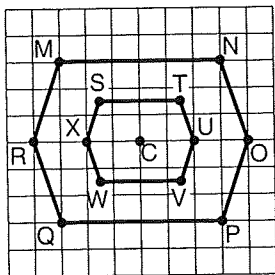
2. $\triangle CKL$ is a dilation image of $\triangle CKL$.



$$\frac{CKL}{CKL} = \frac{2}{2} = 1$$

$|1| = 1 \therefore$ congruence

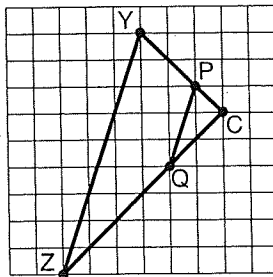
3. $STUVWX$ is a dilation image of $MNOPQR$.



$$\frac{STUVWX}{MNOPQR} = \frac{1}{2}$$

$|\frac{1}{2}| < 1 \therefore$ reduction

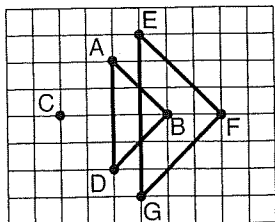
4. $\triangle CPQ$ is a dilation image of $\triangle CYZ$.



$$\frac{CPQ}{CYZ} = \frac{2}{6} = \frac{1}{3}$$

$|\frac{1}{3}| < 1 \therefore$ reduction

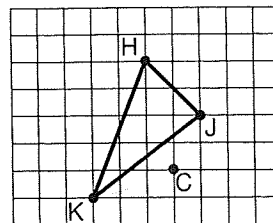
5. $\triangle EFG$ is a dilation image of $\triangle ABC$.



$$\frac{EFG}{ABC} = \frac{3}{2}$$

$|\frac{3}{2}| > 1 \therefore$ enlargement

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



$$\frac{HJK}{HJK} = \frac{2}{2} = 1$$

$|1| = 1 \therefore$ congruence