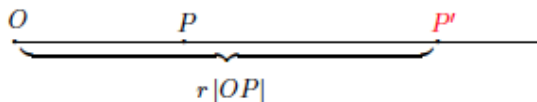


Lesson Summary

Definition: For a positive number r , a *dilation with center O and scale factor r* is the transformation of the plane that maps O to itself, and maps each remaining point P of the plane to its image P' on the ray \overrightarrow{OP} so that $|OP'| = r|OP|$. That is, it is the transformation that assigns to each point P of the plane a point $Dilation(P)$ so that

1. $Dilation(O) = O$ (i.e., a dilation does not move the center of dilation).

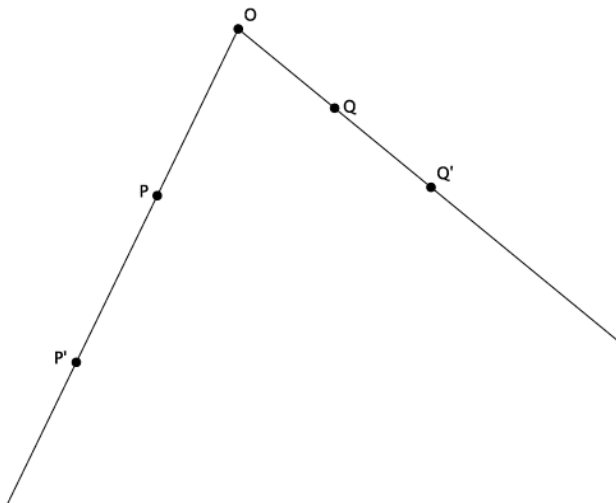


2. If $P \neq O$, then the point $Dilation(P)$ (to be denoted more simply by P') is the point on the ray \overrightarrow{OP} so that $|OP'| = r|OP|$.

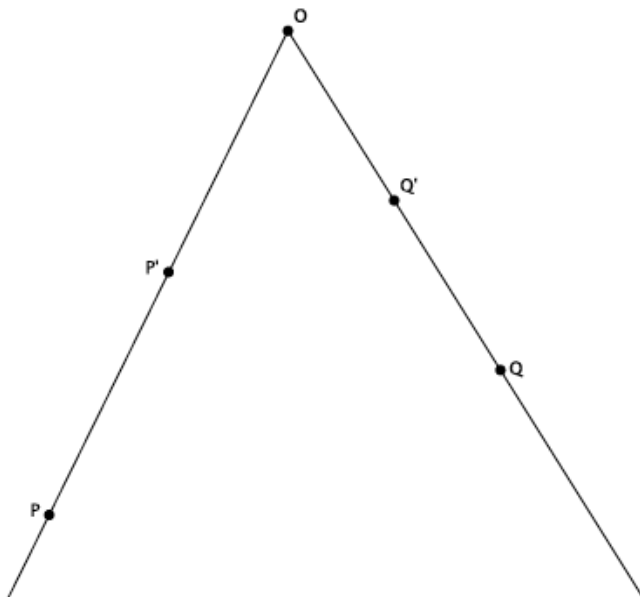
In other words, a dilation is a rule that moves each point P along the ray emanating from the center O to a new point P' on that ray such that the distance $|OP'|$ is r times the distance $|OP|$.

Problem Set

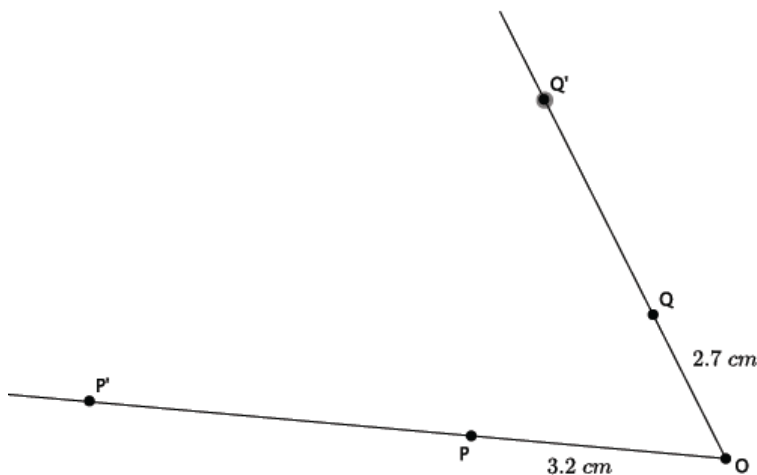
1. Let there be a dilation from center O . Then, $Dilation(P) = P'$ and $Dilation(Q) = Q'$. Examine the drawing below. What can you determine about the scale factor of the dilation?



2. Let there be a dilation from center O . Then, $\text{Dilation}(P) = P'$, and $\text{Dilation}(Q) = Q'$. Examine the drawing below. What can you determine about the scale factor of the dilation?

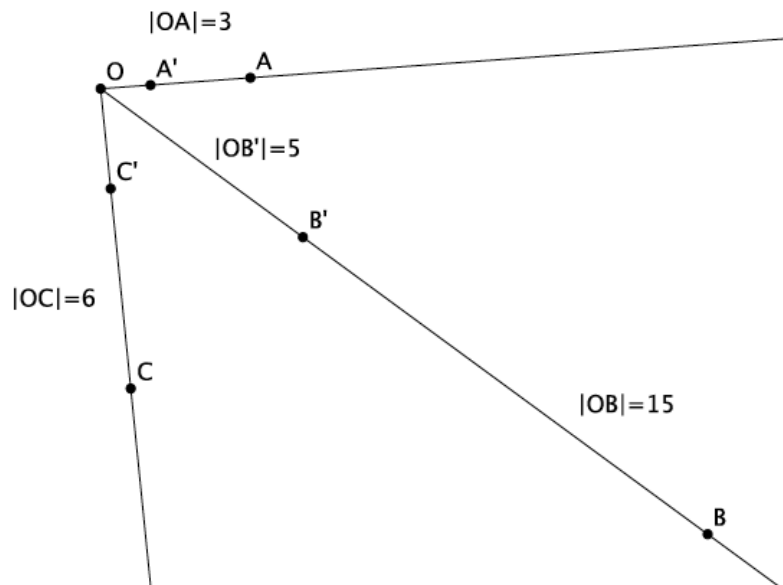


3. Let there be a dilation from center O with a scale factor $r = 4$. Then, $\text{Dilation}(P) = P'$ and $\text{Dilation}(Q) = Q'$. $|OP| = 3.2$ cm, and $|OQ| = 2.7$ cm, as shown. Use the drawing below to answer parts (a) and (b). The drawing is not to scale.



- Use the definition of dilation to determine $|OP'|$.
- Use the definition of dilation to determine $|OQ'|$.

4. Let there be a dilation from center O with a scale factor r . Then, $Dilation(A) = A'$, $Dilation(B) = B'$, and $Dilation(C) = C'$. $|OA| = 3$, $|OB| = 15$, $|OC| = 6$, and $|OB'| = 5$, as shown. Use the drawing below to answer parts (a)–(c).



- Using the definition of dilation with lengths OB and OB' , determine the scale factor of the dilation.
- Use the definition of dilation to determine $|OA'|$.
- Use the definition of dilation to determine $|OC'|$.