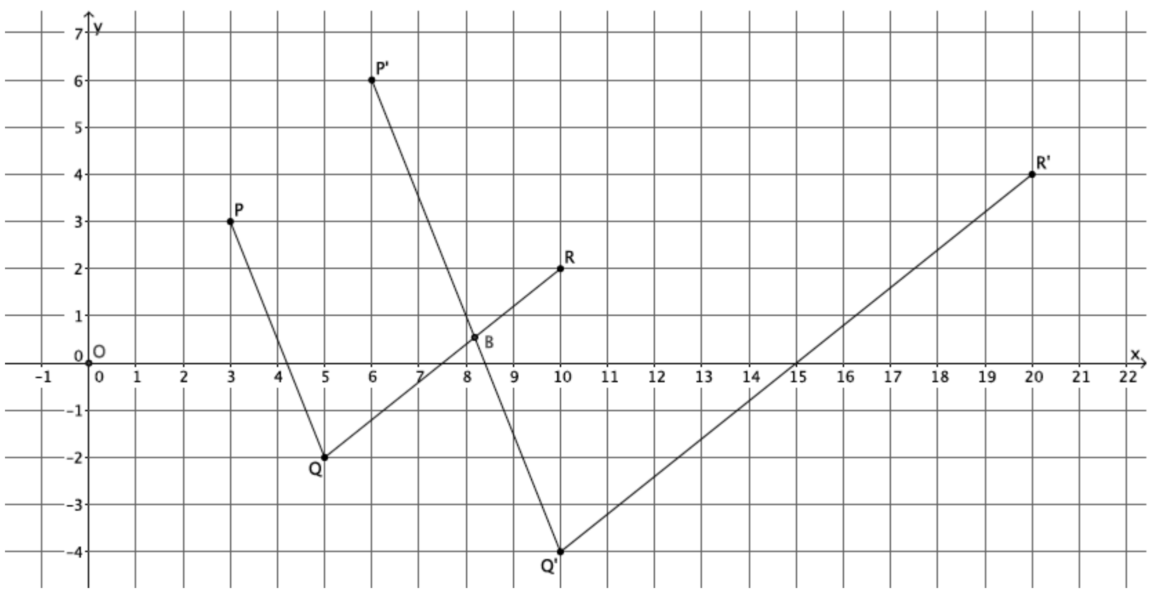
Lesson 7: Informal Proofs of Properties of Dilation

Classwork

Exercise

Use the diagram below to prove the theorem: *Dilations preserve the measures of angles.*

Let there be a dilation from center O with scale factor r. Given $\angle PQR$, show that since $P' = Dilation(P)$, $Q' = Dilation(Q)$, and $R' = Dilation(R)$, then $|\angle PQR| = |\angle P'Q'R'|$. That is, show that the image of the angle after a dilation has the same measure, in degrees, as the original.



Problem Set

1. A dilation from center O by scale factor r of a line maps to what? Verify your claim on the coordinate plane.

2. A dilation from center O by scale factor r of a segment maps to what? Verify your claim on the coordinate plane.

3. A dilation from center O by scale factor r of a ray maps to what? Verify your claim on the coordinate plane.

4. <u>Challenge Problem</u>:

   Prove the theorem: *A dilation maps lines to lines.*

   Let there be a dilation from center O with scale factor r so that $P' = Dilation(P)$ and $Q' = Dilation(Q)$. Show that line PQ maps to line $P'Q'$ (i.e., that dilations map lines to lines). Draw a diagram, and then write your informal proof of the theorem. (Hint: This proof is a lot like the proof for segments. This time, let U be a point on line PQ that is not between points P and Q.)