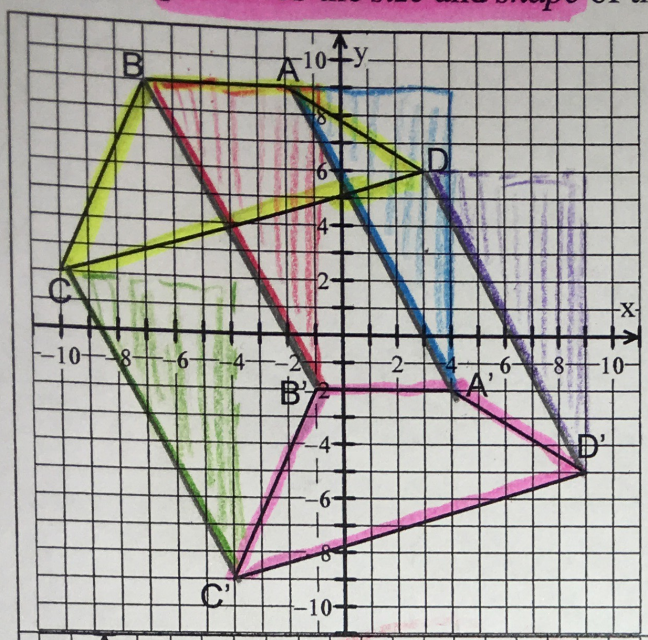
Rigid Transformations

Rigid transformation: A movement that *preserves* the *distance* and *angle measures* of a shape. That is, it *preserves* the *size* and *shape* of the pre-image to the image.

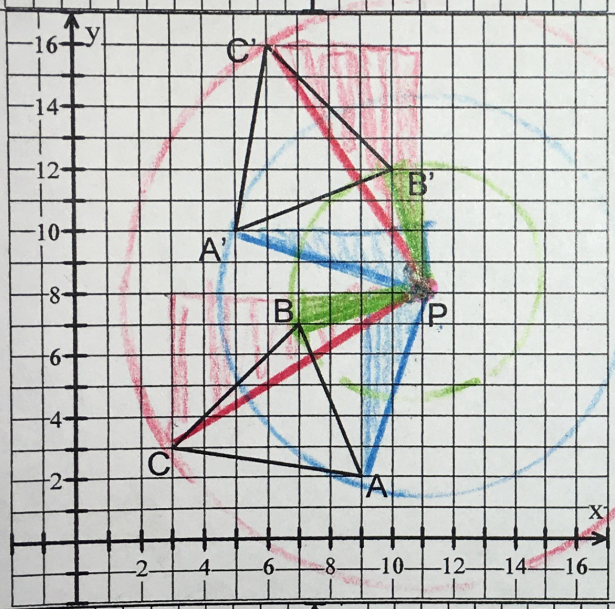


Translation: A transformation that moves a set of points the *same distance* along *lines that are parallel* to each other.

Segments connecting points from corresponding points of the pre-image to image are:

- parallel (same slope) $m = -\frac{11}{6}$
- same length or congruent (Pythagorean Thm) $\frac{6}{11}$

$F(x,y) \rightarrow (x+6, y-11)$



Rotation: a transformation that moves points along *concentric circles* through the *same angle of rotation* around a fixed point.

Corresponding points are: Connected by concentric arcs w/ the same ∠ measure
- segments connect preimage to P & image to P are congruent

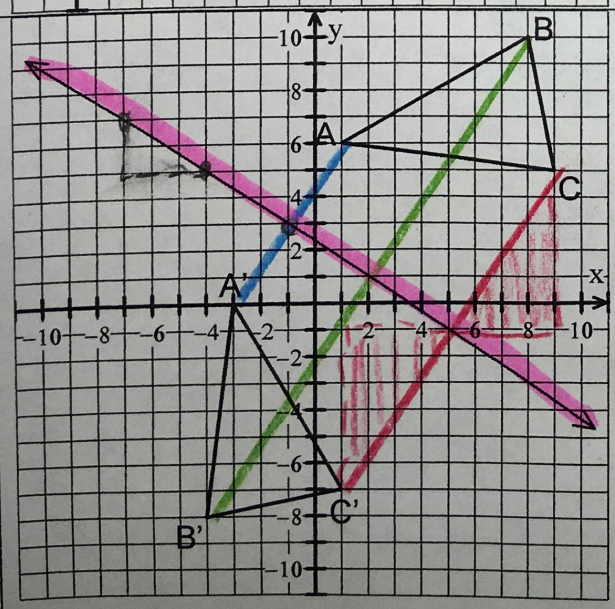
ΔABC is rotated 90° clockwise about point P.

Slope of $\overline{AP} = \frac{2}{6} = \frac{1}{3}$ Slope of $\overline{A'P} = \frac{-6}{2} = -3$

Slope of $\overline{BP} = \frac{1}{4}$ Slope of $\overline{B'P} = -4$

Slope of $\overline{CP} = \frac{5}{8}$ Slope of $\overline{C'P} = -\frac{8}{5}$

* Perpendicular slopes only if 90° or 270° rotation



Reflection: a transformation that *flips* a set of points across a specific *line of reflection* such that the *line of reflection* is the *perpendicular bisector* of each *line segment* connecting the pre-image and corresponding image points.

Segments connecting points from corresponding points of the pre-image to image are:

- bisected by line of reflection
- parallel to each other
- ⊥ to line of reflection

Slope of line of reflection $m = -\frac{2}{3}$

Slope of segments connecting image to pre image $m = \frac{3}{2}$

~~Function for line of reflection: $f(x) = -\frac{2}{3}(x+1)+5$~~