

Transformations

Short-answer problems about the definitions of basic rigid motions and dilations.

To define a translation, rotation, or reflection, we specify the image of a generic point P under the transformation as specified.

Question 1 Under a **rotation** about center O counterclockwise by an angle θ , the image of P is a point Q so that $OQ = OP$ and $m\angle POQ = \theta$, measured counterclockwise from \overrightarrow{OP} to \overrightarrow{OQ} if $\theta > 0$ and measured clockwise if $\theta < 0$. If $P = O$ then $Q = O = P$.

Question 2 Under a **translation** by the distance and direction from A to B , the image of P is a point Q so that $\overrightarrow{PQ} \parallel \overrightarrow{AB}$, $PQ = AB$, and \overrightarrow{PQ} is in the same direction as \overrightarrow{AB} .

Question 3 Under a **reflection** about a line ℓ , if P is on ℓ , then P is mapped to itself. If P is not on ℓ , then the image of P is a point Q so that ℓ is the perpendicular bisector of \overline{PQ} .

Question 4 Under a **dilation** about center O and scale factor $r > 0$, the image of P is a point Q so that Q lies on \overrightarrow{OP} and $OQ = rOP$. The image of O is O .