Transformations by Definition

Translation – a translation that maps point X into X' maps every point P into P' such that:

a) If P does not lie on $\overleftrightarrow{XX'}$, then PXX'P is a parallelogram.
b) If P lies on XX', then there is a segment $\overline{YY'}$, such that both XYY'X' are parallelograms.

Notation: $T_{XX'}$ (x, y) → (x + a, y + b) ***(moving points on the coordinate axes)***

The composition of two reflections over parallel lines has the same effect as a translation twice the distance between the parallel lines.

Reflection in a Line – a reflection in a line *k* maps every point P into a point P' such that:

a) If P does not lie on *k*, the *k* is the perpendicular bisector of $\overline{PP'}$.
b) If P lies on *k*, then P' is the same point as P.

Notation: $R_{x\text{-axis}}$ (x, y) → (x, –y), some books use *M* (mirror) instead of *R*.

Composition of a reflection over intersecting lines is the same as a rotation (twice the measure of the angle formed by the intersecting lines

Rotation about a point O – a rotation about a point O through $\mathcal{B}°$ maps every point P into P', such that:

a) If P is different from O, the OP' = OP and the $m\angle$P'OP = $\mathcal{B}°$
b) If P is the point O, then P' is the same as O.

Notation: $R_{0, 90°}$ (x, y) → (–y, x) (*draw circles with center O thru pts, then use* $\mathcal{B}°$)

Every rotation about a point O through $\mathcal{B}°$ is equal to the composition of two reflections.