TRANSFORMATIONS: Different ways to manipulate a point, line or shape

Rigid Transformations: when the image is congruent to the pre-image, *preserves shape/size

Non-Rigid Transformations: Do not preserve shape and size!

TRANSLATIONS

A translation is a transformation that slides each point of a figure in the same direction and distance.

Rule Notation:

- Translating LEFT # Units

  $(x, y) \rightarrow (x-\#, y)$

- Translating RIGHT # Units

  $(x, y) \rightarrow (x+\#, y)$

- Translation DOWN # Units

  $(x, y) \rightarrow (x, y-\#)$

- Translation UP # Units

  $(x, y) \rightarrow (x, y+\#)$

ROTATIONS about the center (0, 0)

Rule Notation:

- Rotating 90 CW (**270°** CCW)

  $(x, y) \rightarrow (y, -x)$

- Rotating 180 CW (**180°** CCW)

  $(x, y) \rightarrow (-x, -y)$

- Rotating 270 CW (**90°** CCW)

  $(x, y) \rightarrow (-y, x)$

- Rotating 360 CW (**0°/360°** CCW)

  $(x, y) \rightarrow (x, y)$

ROTATIONS about a Different Center

① Translate to (0,0)

② Rotate

③ Translate back

*redrawing the x and y axis

DILATIONS about the center (0, 0)

$(x, y) \rightarrow (2x, 2y)$
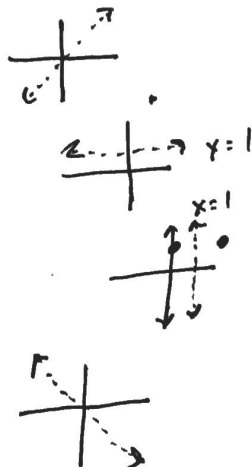
horizontal- stretch/shrink

$(x, y) \rightarrow (2x, y)$

vertical stretch/shrink

$(x, y) \rightarrow (x, 2y)$

DILATIONS about a Different Center

① Translate

② Dilate

③ Translate back

redrawing x and y axis

The **IMAGE** is the result of a transformation.

The **PRE-IMAGE** is the figure before the transformation.

Example:

pre-image   image

$(x, y) \rightarrow '(-y, x)$

REFLECTIONS

- Reflection Across y = x

  $(x, y) \rightarrow (y, x)$

- Reflection Across y = #

  $(x, y) \rightarrow$ (counting technique)

- Reflection Across x = #

  $(x, y) \rightarrow$ (counting technique)

- Reflection Across y = -x

  $(x, y) \rightarrow (-y, -x)$