

## Rules for all Transformations

### Translation Rule

$(x, y) \rightarrow (x + a, y + b)$  If you go left, subtract a. If you go right add a.  
If you go down, subtract b. If you go up add a.

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### Reflection Rule

Over the x-axis:  $(x, y) \rightarrow (x, -y)$  x stays the same. Take the opposite of y.

Over the y-axis:  $(x, y) \rightarrow (-x, y)$  Take the opposite of x. Y stays the same.

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### Rotation Rules

$90^\circ$  C/w :  $(x, y) \rightarrow (y, -x)$  Put opposite of x in y's spot. Put y in x's spot.

$90^\circ$  C C/w :  $(x, y) \rightarrow (-y, x)$  Put opposite of y in x's spot. Put x in y's spot.

$180^\circ$  C C/w :  $(x, y) \rightarrow (-x, -y)$  Just put in the opposite of x and the opposite of y in the same spot.

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### Dilation Rule

$(x, y) \rightarrow (kx, ky)$  Multiply or divide both x & y by the same number.