

### Images and their transformations on a TI-83

Use  $x_1$  and  $y_1$  on the pre-image curve.

Use  $x_2$  and  $y_2$  for the image of this point.

The mapping rule  $(x_1, y_1) \rightarrow (x_1 + 5, y_1) = (x_2, y_2)$  leads easily to the substitutions for the equation:

$$x_1 = x_2 - 5$$

$$y_1 = y_2$$

which when substituted in the pre-image curve's equation  $y_1 = x_1^2$  result in the image curve's equation of  $y_2 = (x_2 - 5)^2$ ,

The real beauty of this method is when you use the graphing calculator in parametric mode.

Graph the pre-image as:

$$x_1 = t$$

$$y_1 = t^2$$

Then the image is simply:

$$x_2 = x_1 + 5$$

$$y_2 = y_1$$

And then if you press TRACE, you can toggle back and forth between pre-image and image points on the two graphs. This method works beautifully for all relations and all transformations that are studied at the high school level, including rotations, etc.