COMBINATIONS OF TRANSFORMATIONS

PART 1 : For the image functions listed in the chart, describe in words all transformations:

Basic Graph	Image	Description of Transformations
$y = x^2$	$y = 2(x-1)^2 + 4$	- VS x 2 - right 1 - up 4
$y = x^3$	$y = \frac{1}{2}x^3 - 2$	- VS x ½ - down 2
$y = \sqrt{x}$	$y = \sqrt{2x+4} - 1$ ↳ $y = \sqrt{2(x+2)} - 1$	- HS x ½ - left 2 - down 1
$y = \lvert x \rvert$	$y = -\lvert 3x - 6 \rvert$ ↳ $y = -\lvert 3(x-2) \rvert$	- reflection over x-axis - HS x ⅓ - right 2
$y = x^2$	$y = (-\frac{1}{2}x - 1)^2 + 4$ ↳ $y = (-\frac{1}{2}(x+2))^2 + 4$	- reflection over y-axis - HS x 2 - left 2 - up 4
$y = \sqrt{x}$	$y = -2\sqrt{x-4} + 3$	- reflection over x-axis - VS x 2 - up 3 - right 4

Part 2: Use the graphing calculators to graph each image function. Look at the graph to determine the DOMAIN and RANGE for each.

Basic Graph	Image	DOMAIN and RANGE
$y = x^2$	$y = 2(x-1)^2 + 4$	
$y = x^3$	$y = \frac{1}{2}x^3 - 2$	
$y = \sqrt{x}$	$y = \sqrt{2x+4} - 1$	
$y = \lvert x \rvert$	$y = -\lvert 3x - 6 \rvert$	
$y = x^2$	$y = (-\frac{1}{2}x - 1)^2 + 4$	
$y = \sqrt{x}$	$y = -2\sqrt{x-4} + 3$	

PART 3 : For the image functions listed in the chart, state the mapping notation that describes the transformations:

Basic Graph	Image	Mapping Notation
$y = x^2$	$y = 2(x - 1)^2 + 4$	$(x, y) \rightarrow (x+1, 2y+4)$
$y = x^3$	$y = \frac{1}{2}x^3 - 2$	$(x, y) \rightarrow (x, \frac{1}{2}y - 2)$
$y = \sqrt{x}$	$y = \sqrt{2x + 4} - 1$ $y = \sqrt{2(x+2)} - 1$	$(x, y) \rightarrow (\frac{1}{2}x - 2, y - 1)$
$y = \lvert x \rvert$	$y = -\lvert 3x - 6 \rvert$ $y = -\lvert 3(x-2) \rvert$	$(x, y) \rightarrow (\frac{1}{3}x + 2, -y)$
$y = x^2$	$y = (-\frac{1}{2}x - 1)^2 + 4$ $y = (-\frac{1}{2}(x+2))^2 + 4$	$(x, y) \rightarrow (-2x - 2, y + 4)$
$y = \sqrt{x}$	$y = -2\sqrt{x - 4} + 3$	$(x, y) \rightarrow (x + 4, -2y + 3)$

PART 4 : Use the mapping notation from PART 3 to determine the table of values and then graph the following image functions:

$y = 2(x - 1)^2 + 4$

$y = \sqrt{2x + 4} - 1$

$y = -\lvert 3x - 6 \rvert$