Investigation #3 Analyzing the Graph of $y = (x - p)^2 + q$

Consider the function $f(x) = x^2$.

a) Write an equation which represents $f(x + 2) - 4$.

b) Predict the transformations on $y = x^2$ in a). Use a graphing calculator to verify the results.

c) Complete the following chart.

Function	*Equation Representing Function*	*Vertex*	*Max/Min Value*	*Equation of Axis of Symmetry*	*Description of Transformation*
$y = f(x)$	$y = x^2$	(0, 0)	min, 0	$x = 0$	no transformation
$y = f(x + 2) - 4$					
$y = f(x - p) + q$					

$y = a(x-p)^2+q$

Class Ex. #1

Describe how the graphs of the following functions relate to the graph of $y = x^2$.

a) $y = (x + 10)^2$ $y=(x-(-10))^2$ $p=-10$ horizontal translation 10 units left

b) $y = x^2 + 4$ $q=4$ vertical translation 4 units up.

c) $y + 8 = (x - 5)^2$ $y=(x-5)^2-8$ $p=5$ hor. transl. 5 right $q=-8$ vert. transl. 8 down

Class Ex. #2

The following transformations are applied to the graph of $y = x^2$. Write the equation of the image function for each.

a) a horizontal translation of 5 units right $p=5$ $y=(x-5)^2$

b) a translation of 6 units down and 4 units left $q=-6$ $p=-4$ $y=(x-(-4))^2-6$ $y=(x+4)^2-6$

Class Ex. #3

Write the coordinates of the image of the point (3, 9) on the graph $y = x^2$ when a translation of two units up and seven units right is applied.

(3, 9) → (10, 11) 2 up 7 right

Complete Assignment Questions #1 - #10