Transformations of Functions

For problems 1 and 2 choose the best answer that describes the transformations.

1. The function $f(x) = |x+5| - 3$
   is a shift of $f(x) = |x|$
   a) 5 units up and 3 units to the right
   b) 5 units down and 3 units to the left
   c) 5 units to the right and 3 units up
   d) 5 units to the left and 3 units down

2. The function $f(x) = (x-2)^2 + 1$
   is a shift of $f(x) = x^2$
   a) 2 units up and 1 unit to the left
   b) 2 units down and 1 unit to the right
   c) 2 units to the right and 1 unit up
   d) 2 units to the left and 1 unit down

3. Describe the transformation of the parabola $y = (x-1)^2 + 5$?

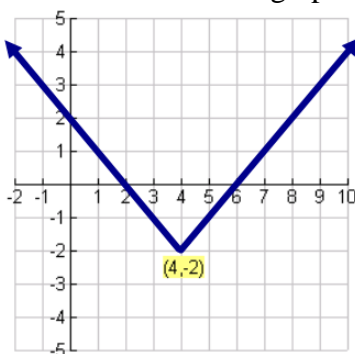4. Describe the transformation of $f(x) = x^2$ under the following conditions:

   (a) $f(x) = (x + 3)^2$

   (c) $f(x) = (x - 3)^2 + 2$

   (b) $f(x) = -2(x+1)^2 + 3$

   (d) $f(x) = 4(x+1)^2$

5. Given the parent function $y = |x|$,
   what is the function of the graph below?

(4,-2)

6. **Describe how the graph of each of the functions below compares to the graph of the function $f(x)$.**

   $f(x) + 6$

   $6f(x)$

   $f\left(\dfrac{1}{6}x\right)$

   $\left(\dfrac{1}{3}\right)f(x-2)$

Given the parent function and a description of the transformation, write the equation of the transformed function, f(x) and the geometric transformation.

7. Absolute value — vertical shift up 5, horizontal shift right 3.

8. Quadratic — vertical stretch by 5, horizontal shift left 8.