Exploring Transformations Review from Math 3 Activity

Directions: Using desmos (www.desmos.com), explore the different transformations of the parent function $y = x^2$.

- ***Step 1:*** Plot the function $y = x^2$ in the top #1 spot. (This function will stay here. The rest of the functions will be plot in the #2 spot.)

- ***Step 2:*** Keeping $y = x^2$ in the first spot, graph the function $y = x^2 + a$. Add a slider to a and move it around to see what happens to the graph

  What do you notice happens to the graph when a is positive? When a is negative? it changes the graphs location. goes up & down

  Name of Transformation: vertical shift

- ***Step 3:*** Graph the function $y = (x + a)^2$. Add a slider to a and move it around.

  What do you notice happens to the graph when a is positive? When a is negative? changes the graphs location. moves right and left.

  Name of Transformation: horizontal shift.

graph transforms opposite of what you would think it should

- ***Step 4:*** Graph the function $y = (ax)^2$. Add a slider to a and move it around.

  What do you notice happens to the graph when a is between -1 and 1? When a>1 and a<-1? "a" shrinks (compress) or stretches graph

  Name of transformation: horizontal compression

- ***Step 5:*** Graph the function $y = -ax^2$. Add a slider to a.

  What do you notice happens to the graph when a is negative? flips over the x-axis

  Name of transformation: reflection over x-axis

- ***Step 6:*** Graph the function $y = a(x)^2$. Add a slider to a and move it around.

  What do you notice happens to the graph when a is between -1 and 1? When a>1 and a<-1? a graphs shrinks or stretches.

  Name of transformation: vertical stretch or shrink

Describe the transformations of the following functions from left to right:

1. $f(x) = -3\left(\frac{1}{2}x + 2\right)^2 - 6$

① ② ③ ④ ⑤

$f(x) = -3(1/2(x+4))^2 - 6$

① flip over x-axis
② vertical stretch of 3
③ horizontal stretch of 2
④ left 4
⑤ down 6

2. $a(x) = \frac{1}{2}|2x + 1| - 3$

① ② ③ ④

$a(x) = 1/2\,|2(x+1/2)| - 3$

① vertical shrink of 1/2
② horizontal shrink of 1/2
③ left 1/2
④ down 3

3. $g(x) = -4\sqrt{4x + 1} - 4$

See below

4. $f(x) = 8\left(\frac{2}{3}(x - 4)\right)^3 + 5$

See below

5. $f(x) = -\frac{1}{3}\left(4x + \frac{1}{2}\right)^2 - 9$

(3) $g(x) = -4\sqrt{4(x+1/4)} - 4$

① ② ③ ④ ⑤

① flip over x-axis
② vert. stretch of 4
③ horizontal shrink of 1/4
④ left 1/4
⑤ down 4

(4) $f(x) = 8\left(\frac{2}{3}(x-4)\right)^3 + 5$

① ② ③ ④

① vert. stretch of 8
② horizontal stretch of 3/2
③ right 4
④ up 5

(5) $f(x) = -\frac{1}{3}\left(4(x+\frac{1}{8})\right)^2 - 9$

① ② ③ ④ ⑤

① flip over x-axis
② vertical shrink of 1/3
③ horizontal shrink of 1/4
④ left 1/8
⑤ down 9.