

**State the parent function for each function below. Then describe the transformation(s) for each function.**

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

| Parent Function: | Vertical Reflection: | Horizontal Reflection: | Horizontal Shift:<br>Direction? How many? | Vertical Shift:<br>Direction? How many? |
|------------------|----------------------|------------------------|---|---|
| $\sqrt{x}$       | N/A                  | N/A                    | $\rightarrow$ 4                           | $\downarrow$ 3                          |

2.)  $b(x) = -\sqrt{x+1}$

| Parent Function: | Vertical Reflection: | Horizontal Reflection: | Horizontal Shift:<br>Direction? How many? | Vertical Shift:<br>Direction? How many? |
|------------------|----------------------|------------------------|---|---|
| $\sqrt{x}$       | yes                  | N/A                    | $\leftarrow$ 1                            | N/A                                     |

3.)  $n(x) = \sqrt[3]{-x}$

| Parent Function: | Vertical Reflection: | Horizontal Reflection: | Horizontal Shift:<br>Direction? How many? | Vertical Shift:<br>Direction? How many? |
|------------------|----------------------|------------------------|---|---|
| $\sqrt[3]{x}$    | N/A                  | yes                    | N/A                                       | N/A                                     |

4.)  $d(x) = -\sqrt[3]{x+4} - 1$

| Parent Function: | Vertical Reflection: | Horizontal Reflection: | Horizontal Shift:<br>Direction? How many? | Vertical Shift:<br>Direction? How many? |
|------------------|----------------------|------------------------|---|---|
| $\sqrt[3]{x}$    | yes                  | N/A                    | $\leftarrow$ 4                            | $\downarrow$ 1                          |

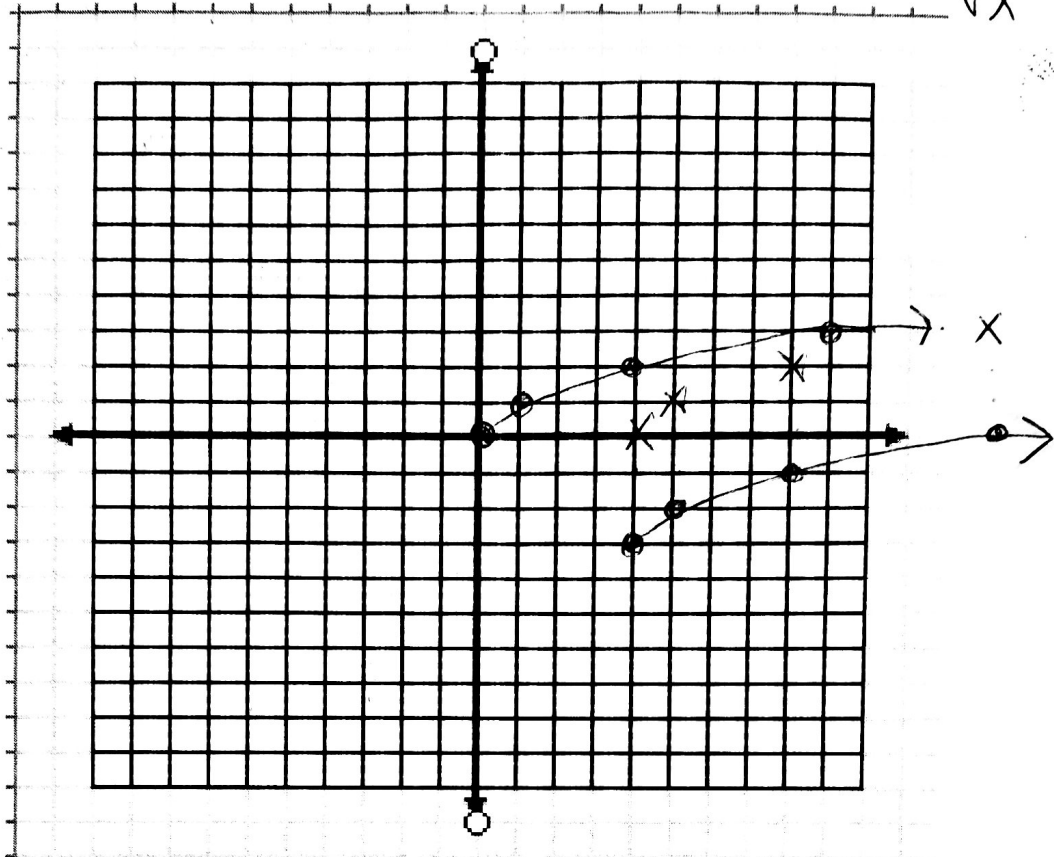
Graph using transformations. Include the parent function on your graph.

5.) Graph # 1

$$\sqrt{x-4} - 3$$

| X | Y |
|---|---|
| 0 | 0 |
| 1 | 1 |
| 4 | 2 |
| 9 | 3 |

| $x+4$ | $y-3$ |
|-------|-------|
| 4     | -3    |
| 5     | -2    |
| 9     | -1    |
| 13    | 0     |



6.) Graph # 4

$$-\sqrt[3]{x+4} - 1$$

| X  | Y  |
|----|----|
| -8 | -2 |
| -1 | -1 |
| 0  | 0  |
| 1  | 1  |
| 8  | 2  |

| $x+4$ | $-y-1$ |
|-------|--------|
| -12   | 1      |
| -5    | 0      |
| -4    | -1     |
| -3    | -2     |
| 4     | -3     |

