

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Transformations on Parent Functions

For each graph provided below, state the parent function. Then state what happened to each of the parent functions in your own words – did the parent function move left/right/up/down, flip, stretch or compress – to the best of your ability. Lastly, state the domain and range of the transformed function (of the graph given to you) in set-builder notation. The scale on both axes is one unit.

|   |  |   |
|---|--|---|
| <p>1.</p> <p>Parent Function: <math>y = x^2</math></p> <p>Transformations: What happened to the parent function?<br/>reflected on x-axis<br/>translated down 3 units<br/>vertically stretched by factor 2</p> <p>Domain: <math>\mathbb{R}</math> Range: <math>y \leq -3</math></p>      | <p>2.</p> <p>Parent Function: <math>y = x</math></p> <p>Transformations: What happened to the parent function?<br/>translated up 1 [OR] left 2<br/>vertically compressed by factor 1/2</p> <p>Domain: <math>\mathbb{R}</math> Range: <math>\mathbb{R}</math></p>       | <p>3.</p> <p>Parent Function: <math>y = \sqrt{x}</math></p> <p>Transformations: What happened to the parent function?<br/>reflected on x-axis<br/>translated right 2 units<br/>vertically stretched by factor 3</p> <p>Domain: <math>x \geq 2</math> Range: <math>y \leq 0</math></p> |
| <p>4.</p> <p>Parent Function: <math>y = x^3</math></p> <p>Transformations: What happened to the parent function?<br/>translated right 4 units,<br/>down 1 unit<br/>vertically compressed by factor 1/3 or 1/4</p> <p>Domain: <math>\mathbb{R}</math> Range: <math>\mathbb{R}</math></p> | <p>5.</p> <p>Parent Function: <math>y = \sqrt[3]{x}</math></p> <p>Transformations: What happened to the parent function?<br/>translated right 3 units<br/>up 3 units<br/>reflected on x-axis</p> <p>Domain: <math>\mathbb{R}</math> Range: <math>\mathbb{R}</math></p> | <p>6.</p> <p>Parent Function: <math>y =  x </math></p> <p>Transformations: What happened to the parent function?<br/>translated left 1 unit<br/>down 3 units<br/>vertically stretched 4 units</p> <p>Domain: <math>\mathbb{R}</math> Range: <math>y \geq -3</math></p>                |

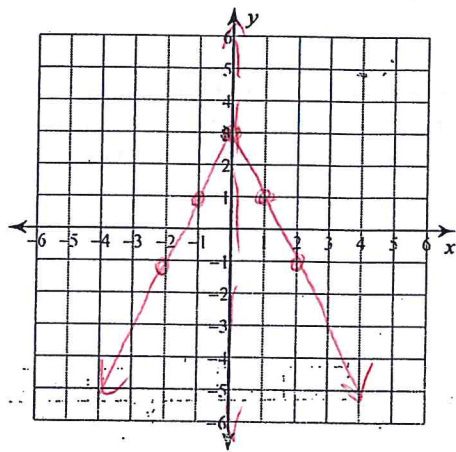
Assignment

Date \_\_\_\_\_

Period \_\_\_\_\_

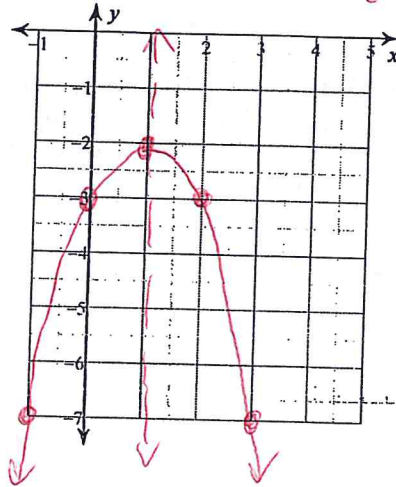
Graph each equation.

1)  $y = -2|x| + 3$   $(h, k) \rightarrow (0, 3)$



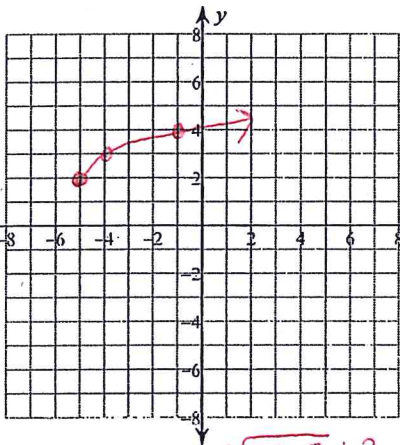
| x | y                                       |
|---|---|
| 1 | -2 1  + 3<br>-2 + 3<br>1                |
| 2 | -2 2  + 3<br>-2 * 2 + 3<br>-4 + 3<br>-1 |

2)  $y = -(x-1)^2 - 2$   $(h, k) \rightarrow (1, -2)$



| x | y  |
|---|--|
| 2 | -(2-1)^2 - 2<br>-(1)^2 - 2<br>-1 - 2<br>-3 |
| 3 | -(3-1)^2 - 2<br>-(2)^2 - 2<br>-4 - 2<br>-6 |

3)  $y = \sqrt{x+5} + 2$   $(h, k) \rightarrow (-5, 2)$

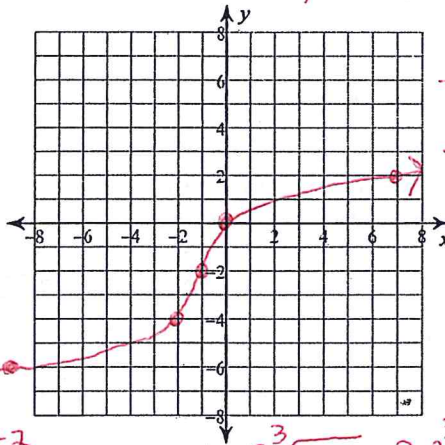


| x  | y |
|----|---|
| -4 | 3 |
| -1 | 4 |

$$\sqrt{-4+5} + 2 = \sqrt{1} + 2 = 1 + 2 = 3$$

$$\sqrt{-1+5} + 2 = \sqrt{4} + 2 = 2 + 2 = 4$$

4)  $y = 2\sqrt[3]{x+1} - 2$   $(h, k) \rightarrow (-1, -2)$

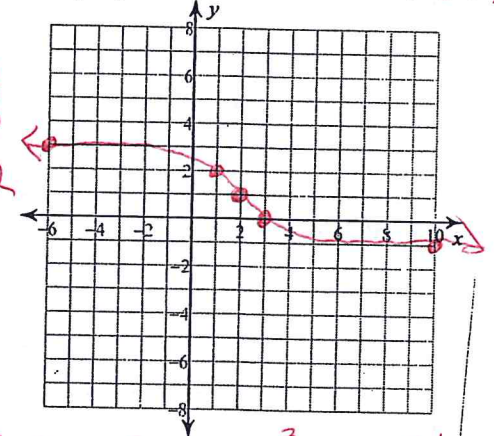


| x | y |
|---|---|
| 0 | 0 |
| 7 | 2 |

$$2\sqrt[3]{0+1} - 2 = 2\sqrt[3]{1} - 2 = 2 \cdot 1 - 2 = 2 - 2 = 0$$

$$2\sqrt[3]{7+1} - 2 = 2\sqrt[3]{8} - 2 = 2 \cdot 2 - 2 = 4 - 2 = 2$$

5) Graph  $y = -\sqrt[3]{x-2} + 1$   $(h, k) \rightarrow (2, 1)$



| x  | y  |
|----|----|
| 3  | 0  |
| 10 | -1 |

6) Write the vertex form of a parabola with vertex (2, -3) which goes through the point (0, 5).

$$y = a(x-h)^2 + k$$

$$(2, -3) \rightarrow (h, k)$$

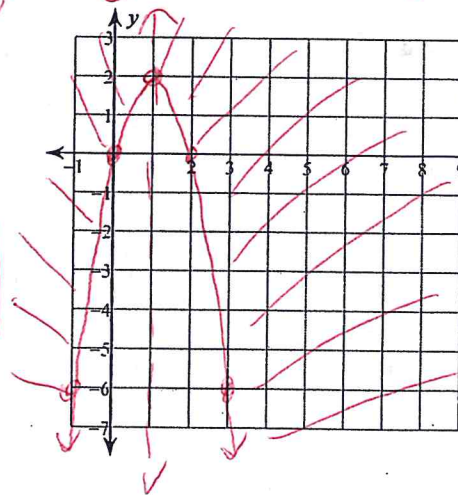
$$y = a(x-2)^2 - 3 \rightarrow y = 2(x-2)^2 - 3$$

$$(0, 5) \rightarrow (x, y)$$

$$5 = a(0-2)^2 - 3$$

$$5 = a(-2)^2 - 3$$

$$5 = 4a - 3 \rightarrow \frac{8}{4} = \frac{4a}{4} \quad a = 2$$



| x | y  |
|---|----|
| 2 | 0  |
| 3 | -6 |