Name:_____ Date:_____

**UNIT 10** **LESSON 1**

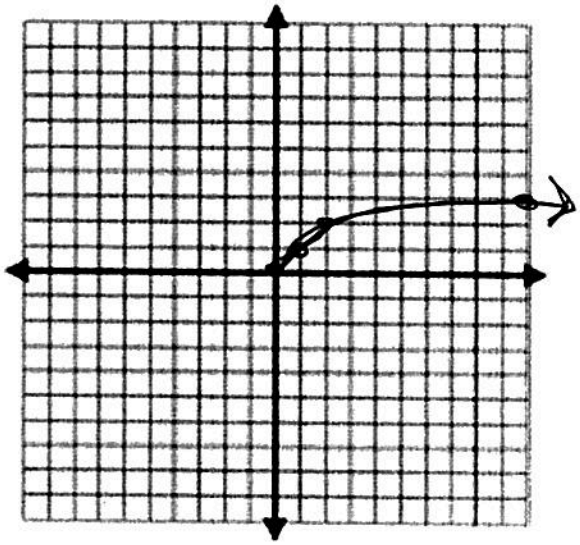
**Aim: Identifying the characteristics of Cubic, Square Root, and Cube Root Functions**

1) Given: $y = \sqrt{x}$

a) Type of Function: Square root

b) Graph $y = \sqrt{x}$

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



c) Notice, the function was only graphed for positive x values, explain why?

The negative x-values had errors

d) Identify the domain of this function.

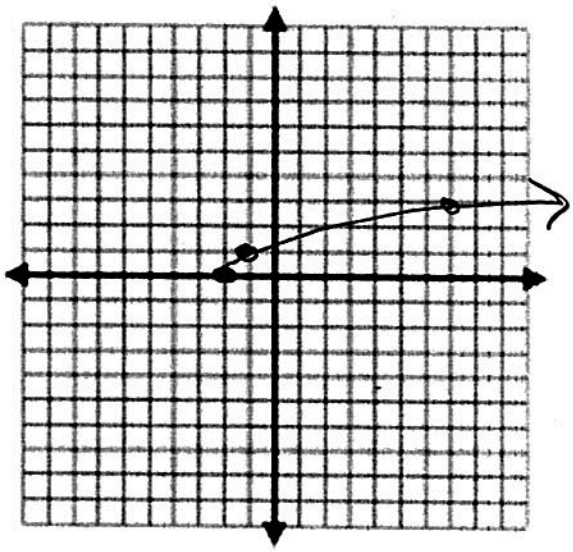
$\{x \mid \geq 0\}$

e) Identify the range of this function.

$\{y \mid y \geq 0\}$

2) Graph $y = \sqrt{x+2}$

| X | Y |
|---|---|
| -2 | 0 |
| -1 | 1 |
| 2 | 2 |
| 7 | 3 |



(a) Identify the domain of this function.

$\{x \mid x \geq -2\}$

(b) Identify the range of this function.

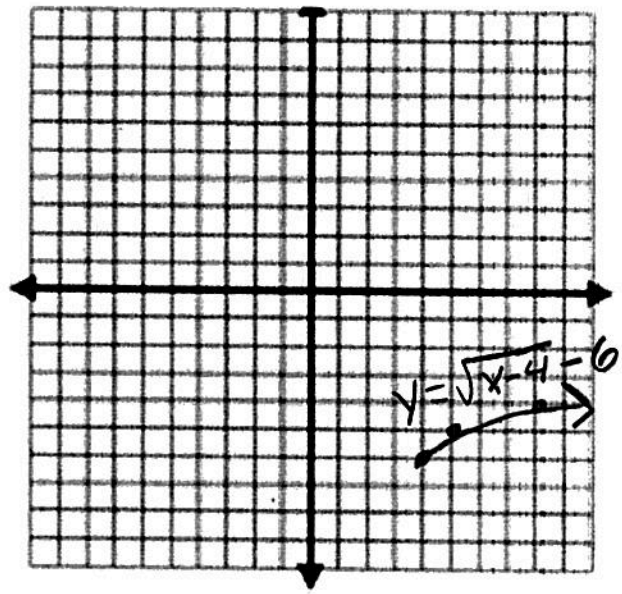
$\{y \mid y \geq 0\}$

3) Graph $y = \sqrt{x-4} - 6$ → Down 6 units

↓

Right 4 units

| x | y |
|---|---|
| 4 | -6 |
| 5 | -5 |
| 8 | -4 |




(a) Identify the domain of this function.

$\{x \mid x \geq 4\}$

(b) Identify the range of this function.

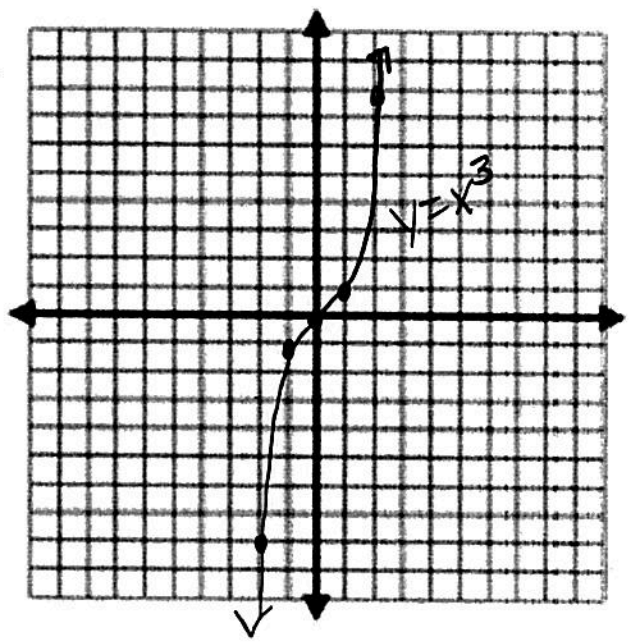
$\{y \mid y \geq -6\}$

4) Given: $y = x^3$

a) Type of Function: Cubic

b) **Graph** $f(x) = x^3$

| x | y |
|---|---|
| -2 | -8 |
| -1 | -1 |
| 0 | 0 |
| 1 | 1 |
| 2 | 8 |




a) Identify the domain of this function.

$\{x \mid x \in \mathbb{R}\}$

d) Identify the range of this function.

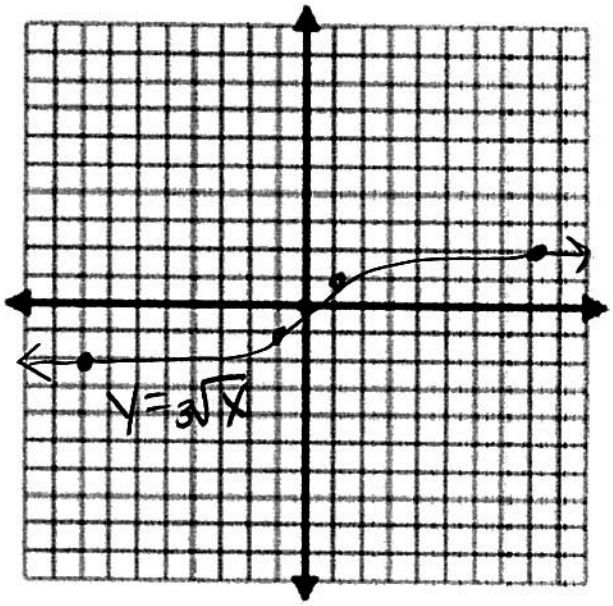
$\{y \mid y \in \mathbb{R}\}$

5) Given: $y=\sqrt[3]{x}$

a) Type of Function: Cube Root

b) Graph $f(x) = \sqrt[3]{x}$

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




c) Identify the domain of this function.

$\{x \mid x \in \mathbb{R}\}$

d) Identify the range of this function.

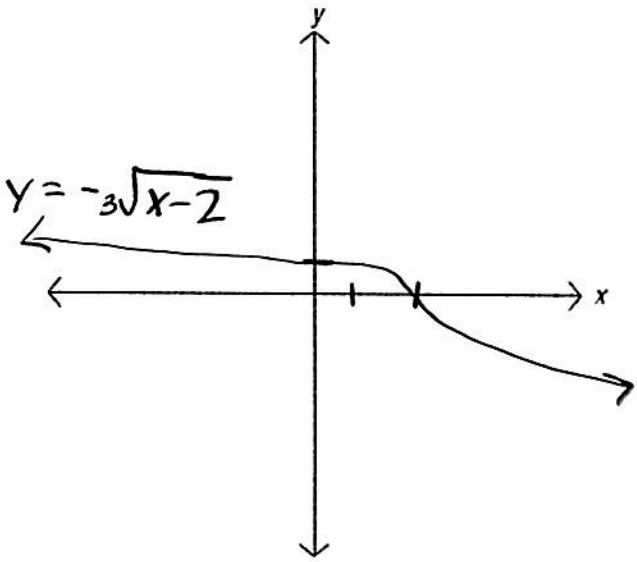
$\{y \mid y \in \mathbb{R}\}$

**Practice Problems**

6) Sketch $y = -\sqrt[3]{x-2}$ and determine the domain and range.

D: $\{x \mid x \in \mathbb{R}\}$

R: $\{y \mid y \in \mathbb{R}\}$

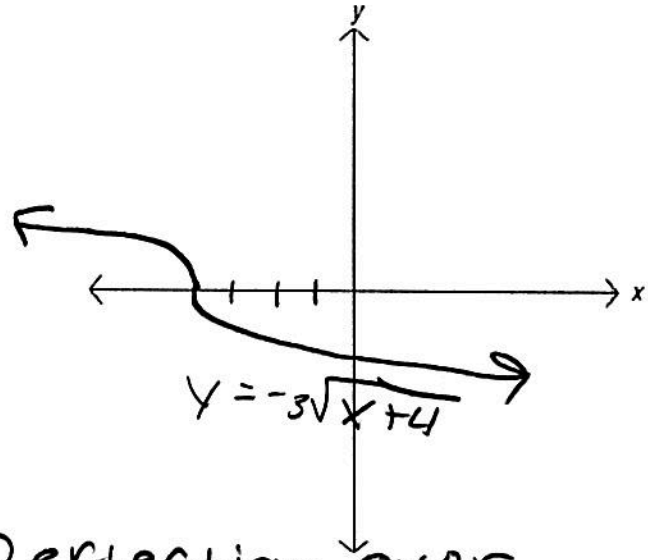



Describe the transformation from the parent graph of $y = \sqrt[3]{x}$: Reflection over the x-axis and right 2 units.

7) Sketch $y = -\sqrt[3]{x+4}$ and determine the domain and range.

D: $\{x \mid x \in \mathbb{R}\}$

R: $\{y \mid y \in \mathbb{R}\}$

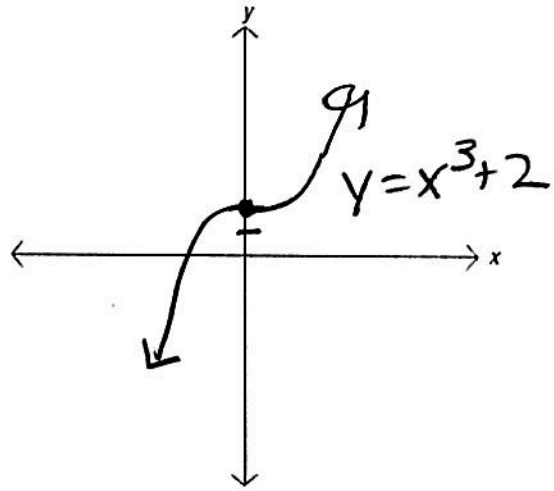



Describe the transformation from the parent graph of $y = \sqrt[3]{x}$: Reflection over x-axis and left 4 units

8) Sketch $y = x^3 + 2$ and determine the domain and range.

D: $\{x \mid x \in \mathbb{R}\}$

R: $\{y \mid y \in \mathbb{R}\}$

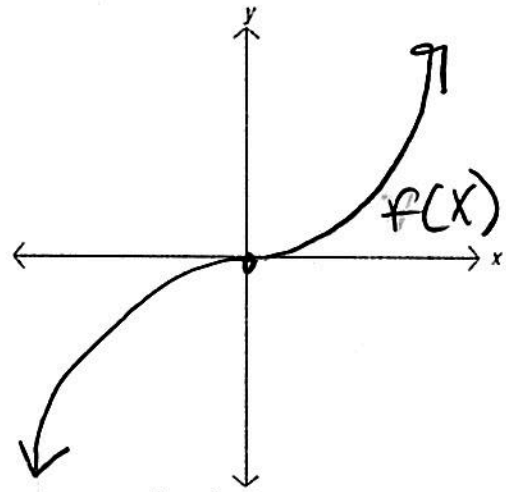



Describe the transformation from the parent graph of $f(x) = x^3$: Shifted up 2 units

9) Sketch $\frac{1}{4}x^3 = f(x)$ and determine the domain and range.

D: $\{x \mid x \in \mathbb{R}\}$

R: $\{y \mid y \in \mathbb{R}\}$




Describe the transformation from the parent graph of $f(x) = x^3$: more wide

10) Write a function with a graph that translates $y=\sqrt{x}$ in each way.

a. Shifted 9 units to the left

$$y=\sqrt{x+9}$$

b. reflected in the x axis

$$y=-\sqrt{x}$$

c. Shifted down 5 units to the right 3 units

$$y=\sqrt{x-3}-5$$

d. vertical stretch

$$y=4\sqrt{x}$$