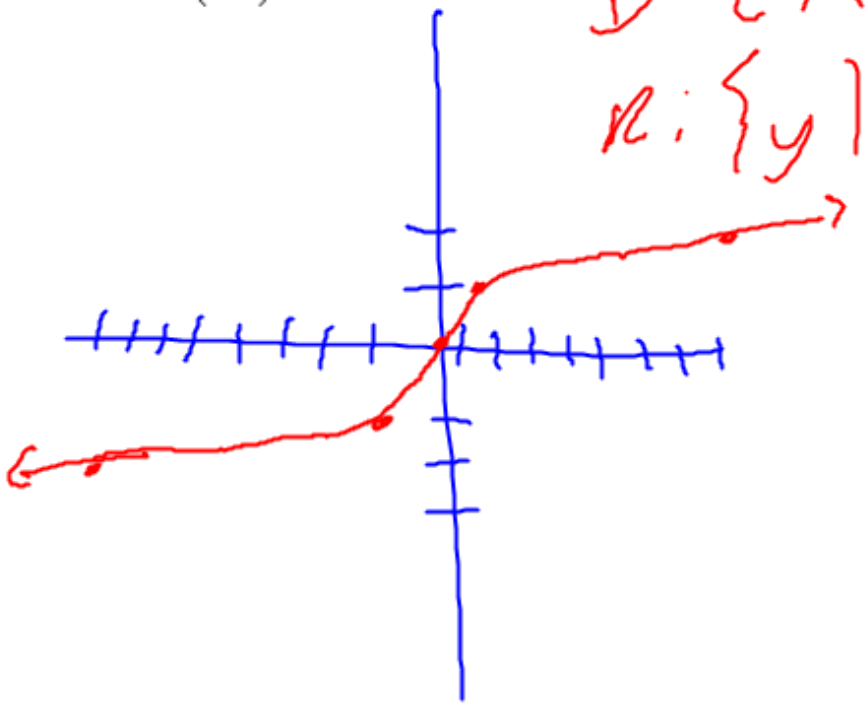
Graph each function and identify its domain and range.

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



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

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

(0, 0)

(1, 1)

(-1, -1)

(8, 2)

(-8, -2)

Graph each function and identify its domain and range.

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

$$f(x) = 2\sqrt[3]{x-2}$$

$\longrightarrow 2$

V.S. -2

(y-value)

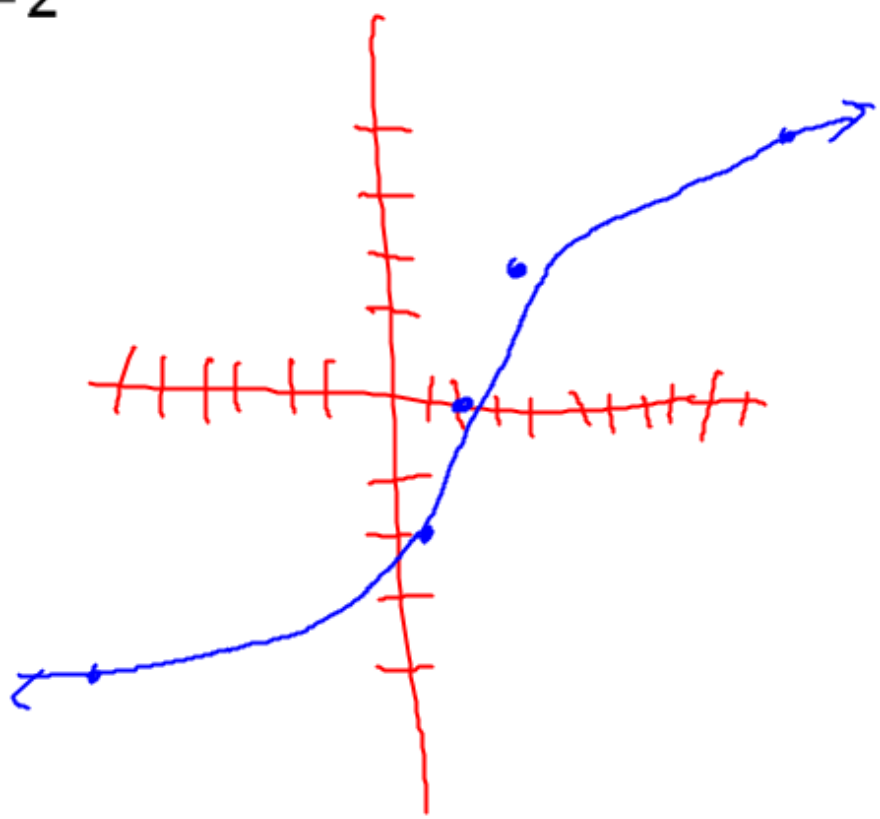
$(0,0) \longrightarrow (2,0)$

$(1,1) \longrightarrow (3,2)$

$(-1,-1) \longrightarrow (1,-2)$

$(8,2) \longrightarrow (10,4)$

$(-6,-2) \longrightarrow (-6,-4)$



A **radical equation** contains a variable within a radical. Recall that you can solve quadratic equations by taking the square root of both sides. Similarly, radical equations can be solved by raising both sides to a power.

Solving Radical Equations	
Steps	**Example**
1. Isolate the radical.	$\sqrt[3]{x} - 2 = 0$ $\sqrt[3]{x} = 2$
2. Raise both sides of the equation to the power equal to the index of the radical.	$\left(\sqrt[3]{x}\right)^3 = (2)^3$
3. Simplify and solve.	$x = 8$

Solve each equation.

$$5 + \sqrt{x + 1} = 16$$

$-5 \quad -5$

$$\left(\sqrt{x+1}\right)^2 = (11)^2$$

$$x + 1 = 121$$

$-1 \quad -1$

$$x = 120$$

Solve the equation.

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

$-4 \quad -4$

$$\left(\sqrt{x-1}\right)^2=(1)^2$$

$$x-1=1$$

$+1 \quad +1$

$$x=2$$

Solve the equation.

$$\left(\sqrt[3]{3x-4}\right)^3 = (2)^3$$

$3x - 4 = 8$

$+4 \quad +4$

$\frac{3x}{3} = \frac{12}{3}$

$x = 4$

Solve the equation.

$$6\sqrt{x+10} = 42$$

$$\frac{6\sqrt{x+10}}{6} = \frac{42}{6}$$

$$\left(\sqrt{x+10}\right)^2 = (7)^2$$

$$x + 10 = 49$$

$$-10 \quad -10$$

$$x = 39$$

Solve each equation.

$$\left(\sqrt{8x+6}\right)^2=\left(3\sqrt{x}\right)^2 \rightarrow 3^2\left(\sqrt{x}\right)^2$$

$$8x+6=9x$$
$$-8x \quad -8x$$
$$6=x$$

Solve $\left(\sqrt{7x+2}\right)^2=\left(3\sqrt{3x-2}\right)^2$

$7x+2=9(3x-2)$

$7x+2=27x-18$

$-7x+18 \quad -7x \quad +18$

$20=20x$

$x=1$

Solve each equation.

$$\left(\sqrt[3]{x+6}\right)^3 = \left(2\sqrt[3]{x-1}\right)^3$$

$$x+6 = 8(x-1)$$

$$x+6 = 8x-8$$

$$-x+8 \quad -x \quad +8$$

$$14 = 7x$$

$$\boxed{x=2}$$

$$\left(\sqrt{x+18}\right)^2 = (x-2)^2$$

$$(x-2)(x-2)$$

$$x^2 - 2x - 2x + 4$$

$$x + 18 = x^2 - 4x + 4$$

$$-x \quad -18 \qquad -x \quad -18$$

$$0 = x^2 - 5x - 14$$

$$(x-7)(x+2)$$

✓ $x = 7$

$x = -2$ ↓ extraneous solution

* Check *

$$\sqrt{7+18} = 7-2$$

$$\sqrt{25} = 5$$

$$5 = 5$$

$$\sqrt{-2+18} = -2-2$$

$$\sqrt{16} = -4$$

$$4 = -4$$