5.2 - Properties of Rational Exponents and Radicals

Warmup

1. $\sqrt{x} = 5$

$x = 25$

2. $\sqrt{2x} = 4$

$x = 8$

3. $\sqrt{x-1} = 3$

$x = 10$

4. $\sqrt{x} - 7 = 0$

$x = 49$

5. $\sqrt{x} + 6 = 0$

no solution

6. $2\sqrt{x} - 3 = 1$

$x = 4$

7. $\sqrt[3]{x-3} = 2$

$x = 11$

8. $\sqrt{x} + \sqrt{x+2} = 0$

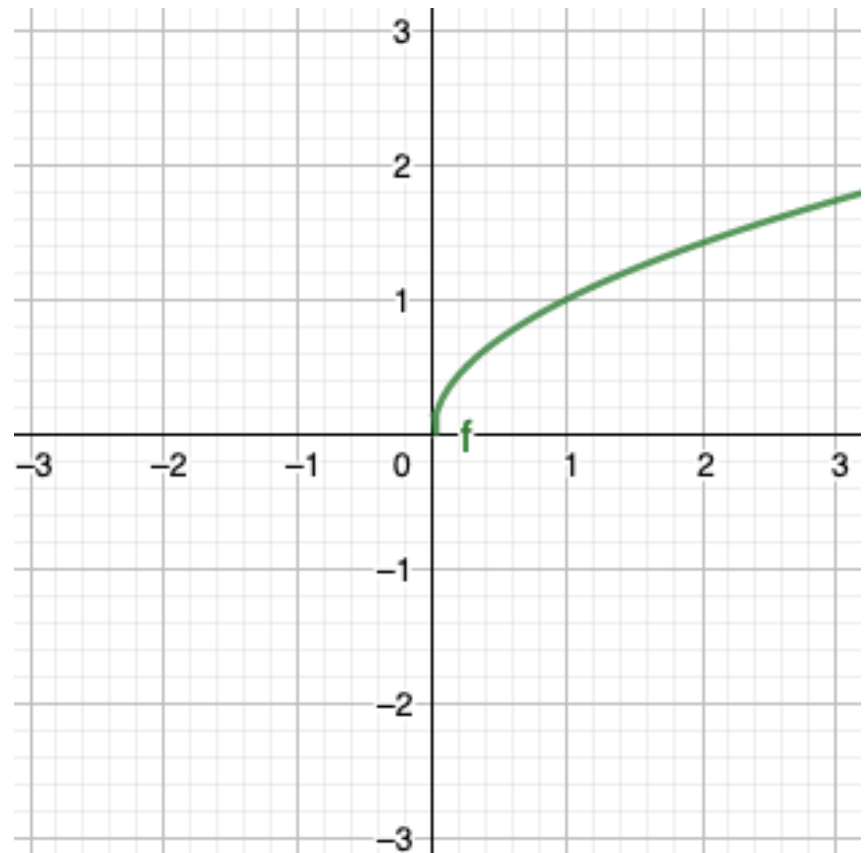*no solution*

9. $\sqrt[3]{x} + 5 = 3$

$x = -8$

5.3 - Graphing Radical Functions
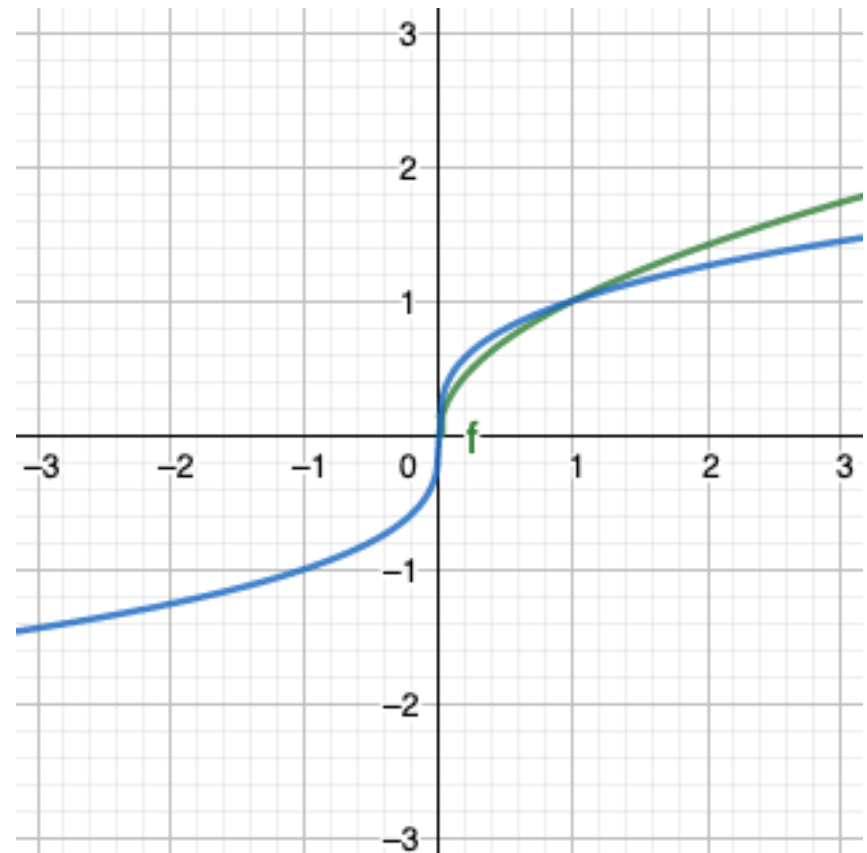
Graphing Simple Radicals

$$f(x) = \sqrt{x}$$

5.3 - Graphing Radical Functions

Graphing Simple Radicals

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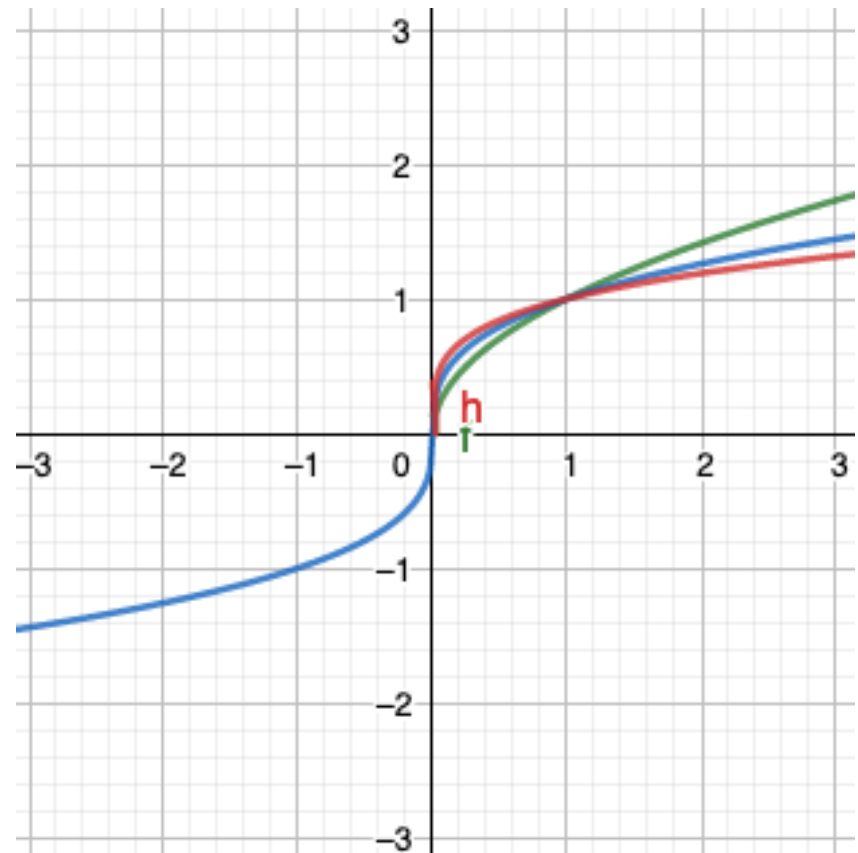
$$g(x) = \sqrt[3]{x}$$

5.3 - Graphing Radical Functions

Graphing Simple Radicals

$$f(x) = \sqrt{x}$$

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

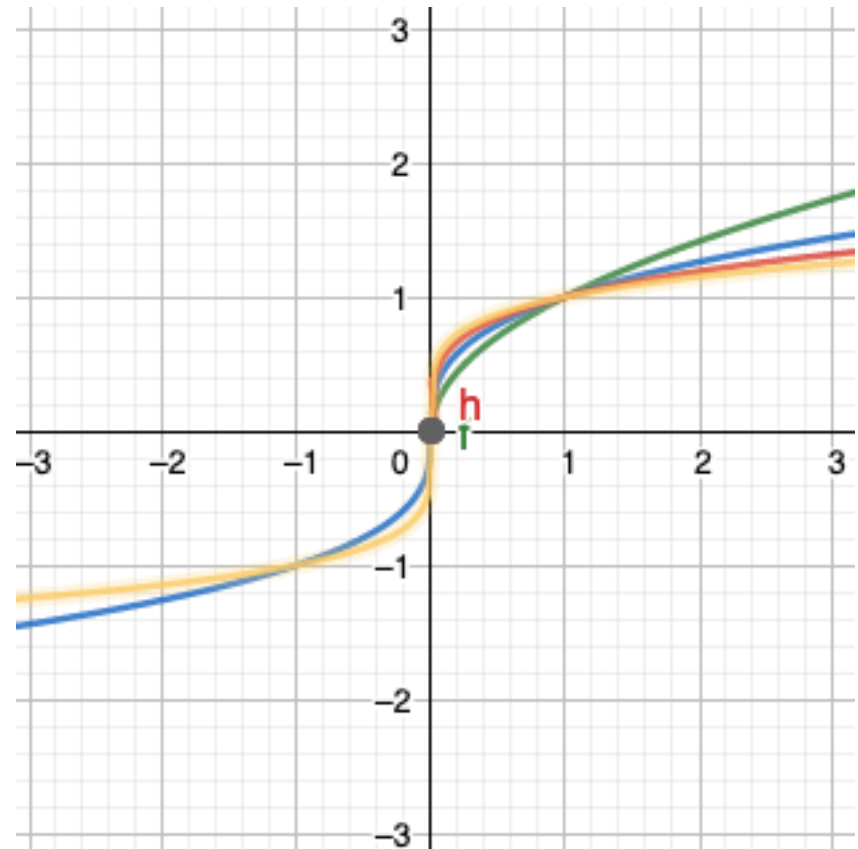$$h(x) = \sqrt[4]{x}$$

5.3 - Graphing Radical Functions

Graphing Simple Radicals

$$f(x) = \sqrt{x}$$

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

$$h(x) = \sqrt[4]{x}$$

$$k(x) = \sqrt[5]{x}$$

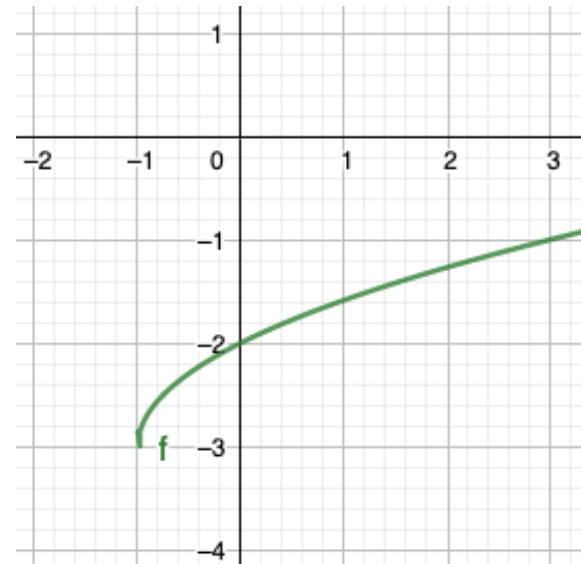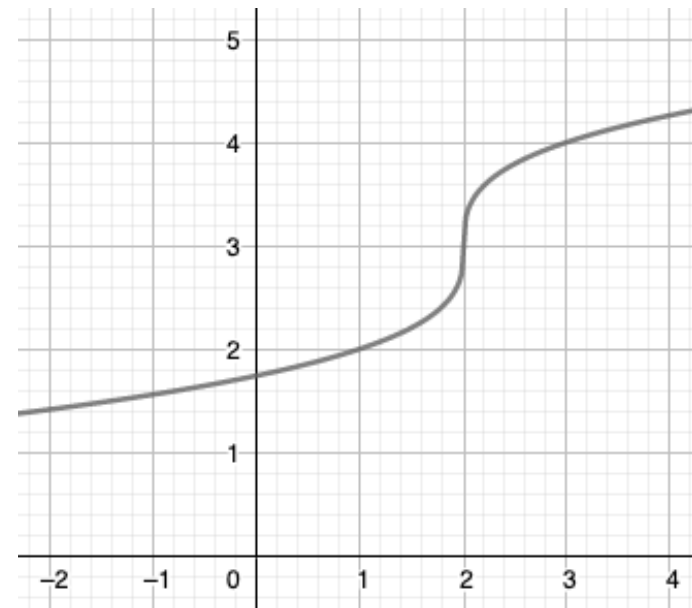# 5.3 - Graphing Radical Functions

Graphing Simple Radicals

$$y = \sqrt{x+1} - 3$$

$$y = \sqrt[3]{x-2} + 3$$

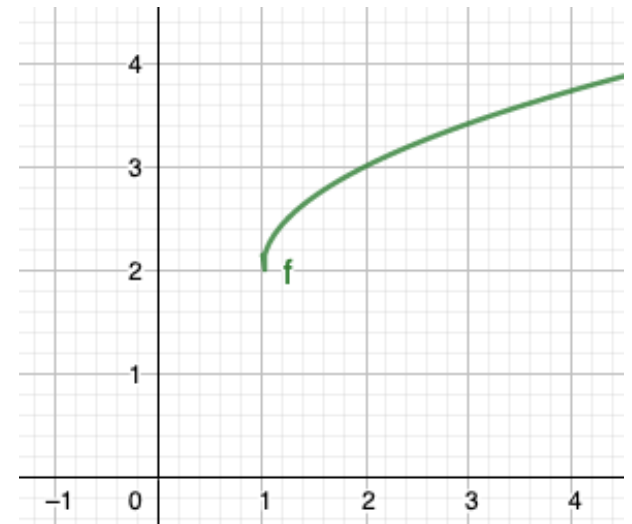# 5.3 - Graphing Radical Functions

Practice

1. $y = \sqrt{x-1} + 2$

2. $y - 2 = \sqrt[3]{x+3} + 2$
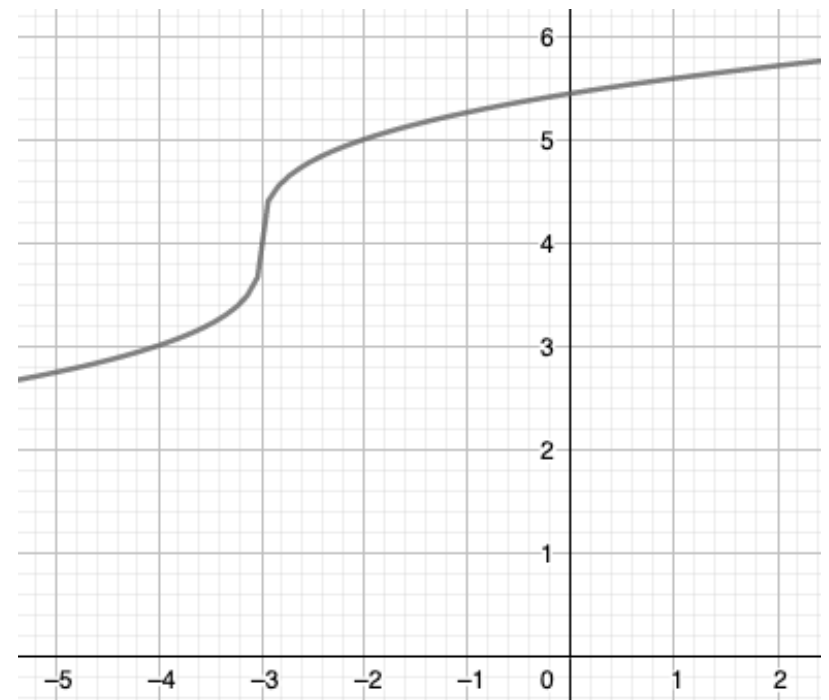
5.3 - Graphing Radical Functions

Find Domain and Range

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

Domain

$x(x-1) \geq 0$

$x \leq 0 \ or \ x \geq 1$

Range

Max y? ∞

Min y? 0

$[0, \infty)$

5.3 - Graphing Radical Functions

Find Domain and Range - Practice

$$y = \sqrt{x(x^2 - 4)}$$

Domain

$$-2 \leq x \leq 0 \ or \ x \geq 2$$

Range

$$[0, \infty)$$

5.4 - Solving Radical Equations and Inequalities

Radical Equations

$$\sqrt{2x+5} = 2\sqrt{2x} + 1$$

$$(\sqrt{2x+5})^2 = (2\sqrt{2x}+1)^2$$

$$2x + 5 = 8x + 4\sqrt{2x} + 1$$

$$-6x + 4 = 4\sqrt{2x}$$

$$(-6x+4)^2 = (4\sqrt{2x})^2$$

$$36x^2 - 48x + 16 = 32x$$

$$9x^2 - 20x + 4 = 0$$

$$x = \frac{2}{9} \ or \ 2$$

5.4 - Solving Radical Equations and Inequalities

Radical Equations

$$\sqrt{2x+5} = 2\sqrt{2x} + 1$$

$$(\sqrt{2x+5})^2 = (2\sqrt{2x} + 1)^2$$

$$2x + 5 = 8x + 4\sqrt{2x} + 1$$

$$-6x + 4 = 4\sqrt{2x}$$

$$(-6x + 4)^2 = (4\sqrt{2x})^2$$

$$36x^2 - 48x + 16 = 32x$$

$$9x^2 - 20x + 4 = 0$$

$$x = \frac{2}{9} \ or \ \cancel{2} \longleftarrow \textbf{Extraneous}$$

Check

$$\sqrt{2(\frac{2}{9}) + 5} = 2\sqrt{2(\frac{2}{9})} + 1$$

$$\sqrt{\frac{49}{9}} = 2\sqrt{\frac{4}{9}} + 1$$

$$\frac{7}{3} = \frac{7}{3}$$

$$\sqrt{2(2) + 5} = 2\sqrt{2(2)} + 1$$

$$\sqrt{9} = 2\sqrt{4} + 1$$

$$3 \neq 5$$

5.4 - Solving Radical Equations and Inequalities

Radical Equations

1. $\sqrt{b+4} = \sqrt{b+20} - 2$

$b = 5$

2. $\sqrt{y+6} - \sqrt{y} = \sqrt{2}$

$y = 2$

3. $\sqrt{x-5} = \sqrt{x} + 1$

no solution

5.4 - Solving Radical Equations and Inequalities

Radical Equations - Practice

1. $x = \sqrt[3]{x^2 - x + 1}$ $x = 1$

5.4 - Solving Radical Equations and Inequalities

Radical Inequalities

$$10 \geq \sqrt{x+1} + 5$$

$$-1 \leq x \leq 24$$

$$10 \geq \sqrt[3]{x+1} + 5$$

$$x \leq 124$$

5.4 - Solving Radical Equations and Inequalities

Radical Inequalities - Practice

$0 \geq \sqrt{-5x+1} - 5$

$-\dfrac{24}{5} \leq x \leq \dfrac{1}{5}$

5.4 - Solving Radical Equations and Inequalities

Radical Inequalities - Practice

$$\sqrt{10} > \sqrt{(x+1)(x-2)}$$ $-3 < x \leq -1$ **or** $2 \leq x < 4$