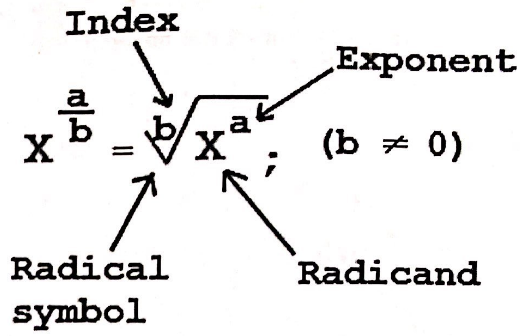
Unit 8 Lesson 4 Homework and Review

1. Rational exponents can be re-written as radicals!



In radical form, **b** is the Index.

In exponential form, **b** is the denominator of the exponent.

In radical form, **a** is the Exponent.

In exponential form, **a** is the numerator of the exponent.

2. Given the expression $\sqrt[3]{54}$, write an expression utilizing a rational exponent that would yield the same numerical value.

$(54)^{1/3}$

3. Rewrite each expression with a rational exponent.

a. $(\sqrt[5]{63})^3$
$(63)^{3/5}$

b. $\sqrt[6]{127^4}$
$(127)^{4/6} = (127)^{2/3}$

c. $(\sqrt[3]{-25})^4$
$(-25)^{4/3}$

d. $(\sqrt{2x})^5$
$(2x)^{5/2}$

e. $(\sqrt[3]{-7x^2y})^2$
$(-7x^2y)^{2/3}$

f. $\sqrt[4]{9x}$
$(9x)^{1/4}$

g. $\sqrt[3]{(5xy)^2}$
$(5xy)^{2/3}$

f. $9(\sqrt[4]{x^5})$
$9(x)^{5/4}$

4. Rewrite each expression in radical form.

a. $(-57)^{\frac{4}{3}}$
$(\sqrt[3]{-57})^4$

b. $13^{\frac{3}{2}}$
$(\sqrt{13})^3$

c. $(204^5)^{\frac{1}{8}}$
$(\sqrt[8]{204})^5$

d. $(3x)^{\frac{4}{3}}$
$(\sqrt[3]{3x})^4$

e. $(3x)^{2.5}$
$(3x)^{5/2}$
$(\sqrt{3x})^5$

f. $(-27x^3y)^{\frac{2}{5}}$
$(\sqrt[5]{-27x^3y})^2$

g. $(7x)^{\frac{1}{2}}$
$\sqrt{7x}$

h. $8(x)^{\frac{3}{4}}$
$8(\sqrt[4]{x})^3$

5. Solve each square root equation. Be sure to check for extraneous solutions.

a. $\sqrt{9a+3} = \sqrt{4a+7}$
$9a+3 = 4a+7$
$5a = 4$
$a = 4/5$
$\{4/5\}$

b. $7 = \sqrt{x+16} + 2$
$5 = \sqrt{x+16}$
$25 = x+16$
$x = 9$
$\{9\}$

c. $x = \sqrt{12-x}$
$x^2 = 12 - x$
$x^2 + x - 12 = 0$
$(x+4)(x-3) = 0$
$x = -4, 3$
$\{3\}$

d. $-x = \sqrt{x+20}$
$x^2 = x+20$
$x^2 - x - 20 = 0$
$(x-5)(x+4) = 0$
$x = 5, -4$
$\{4\}$

e. Desmos: $\sqrt{6x+19} = 2 + x$
$(5, 7)$
$\{5\}$

f. Desmos: $x - 4 = \sqrt{10 - 3x}$
ϕ

6. Write the equation that represents the transformations from the parent graph $y = \sqrt{x}$.

a. Translated 4 units up, vertical compression by a scale factor of 2/3, and reflected over the x-axis.

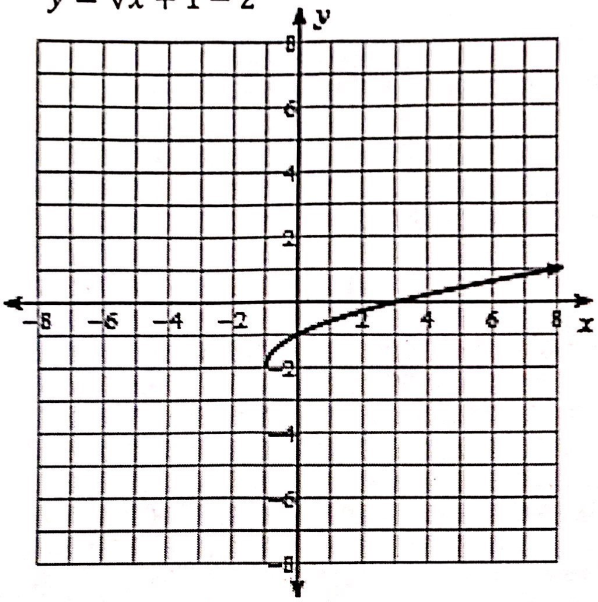
$y = -\frac{2}{3}\sqrt{x} + 4$

b. Translated left 3 units, vertical stretch by a scale factor of 4, down 6 units.

$y = 4\sqrt{x+3} - 6$

7. Use the graph provided to identify key features of the function.

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



Transformations: Left 1, down 2

Anchor Point: (-1, -2)

X-Intercept: (3,0)

Y- Intercept: (0,-1)

Maximum or Minimum (Circle)

Domain: $x \geq -1$ or $[-1, \infty)$

Range: $y \geq -2$ or $[-2, \infty)$

Increasing: $x \geq -1$ $(-1, \infty)$

Decreasing: Never

8. Use Desmos to graph each function and identify the key features.

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

Transformation(s): Reflect over x-axis, up 1

Domain: $x \geq 0$ $[0, \infty)$

Range: $y \leq 1$ $(-\infty, 1]$

x – intercept: (1,0)

y – intercept: (0,1)

b. $y = 2\sqrt{x+3}$

Transformation(s): Vertical stretch by a factor of 2, left 3.

Domain: $x \geq -3$ $[-3, \infty)$

Range: $y \geq 0$ $[0, \infty)$

x – intercept: (-3,0)

y – intercept: (0, 3.46)

c. $y = 5 + \frac{1}{2}\sqrt{x-2}$

Transformation(s): vertical compression by a factor of 1/2, Right 2, up 5

Domain: $x \geq 2$ $[2, \infty)$

Range: $y \geq 5$ $[5, \infty)$

x – intercept: None

y – intercept: None

d. $y = \sqrt{x-1} - 4$

Transformation(s): Right 1, down 4

Domain: $x \geq 1$ $[1, \infty)$

Range: $y \geq -4$ $[-4, \infty)$

x – intercept: (17,0)

y – intercept: none