NOTES: Section 6.1 – Evaluate nth Roots and Use Rational **Exponents**

Goals: #1 - I can interchange an expression between rational and radical notation, and evaluate the expression (using a calculator).

#2 - I can evaluate a rational or radical expression (without using a calculator).

#3 - I can solve equations using nth roots.







Homework: Lesson 6.1 Worksheet

Exploration #1: Work with a partner and answer the following questions.

1. Use a calculator to evaluate the following expressions.

a.
$$\sqrt{25} = 5$$

b.
$$(25)^{1/2} = 5$$

c.
$$(a^{1/3})^3 = 0$$

d.
$$(x^{1/4})^4 = X^{1/4} = X$$

e.
$$\sqrt[3]{64} = 4$$

f.
$$(64)^{1/3} = 4$$

Notes:

There are $\pm w_0$ properties of $\pm v_0$ $\pm v_0$ $\pm v_0$ $\pm v_0$ (a/b) exponents:

•
$$a^{m/n} = (Q^{y_n})^m = (\sqrt[n]{A})^m$$

•
$$a^{-m/n} = \frac{1}{a^{m/n}} = \frac{1}{(a^{1/n})^m} = \frac{1}{(\sqrt[n]{a})^m}$$

Example #1: Rewrite the expression using rational exponent notation.

1. \$\frac{\sqrt{13}}{\sqrt{3}}\$

2. $\sqrt[7]{3}$

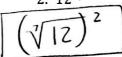
3. $(\sqrt[4]{11})^9$ $(11^{1/4})^9$

Example #2: Rewrite the expression using radical notation.

1. $9^{1/5}$



2. $12^{2/7}$



 $\begin{array}{c|c}
3. & 4^{3/4} \\
\hline
 & 4 \\
\hline
 & 3
\end{array}$

Example #3: Evaluate the expression without using a calculator.

- 1. $16^{3/2}$
- (4)3 (4)3
- 164

- 2. $32^{-3/5}$
- $\left(\sqrt[3]{32}\right)^{-3}$
 - $(Z)^{-3}$
 - 1 23
 - 1/8

You practice: Evaluate the expression without using a calculator.

- 1. 4^{5/2}
- (V4)5
 - $(2)^5$
- 32

- 2. $64^{-2/3}$
- (3/64)-2
 - (4)-2
 - 4-7
 - 10

- 3. $\sqrt[3]{-64}$
 - [-4]

- 3. $(\sqrt[4]{16})^5$
 - $(Z)^5$
 - 32

Name:	Hour:	Date:

Example #4: Evaluate the expression using a calculator. Round answers to the nearest hundredth.

1.
$$(-9)^{1/5}$$

$$\frac{2. \ 12^{3/8}}{2. \ 54}$$

You practice: Evaluate the expression using a calculator. Round answers to the nearest hundredth.

$$\begin{array}{c|c}
2. & 64^{-2/3} \\
\hline
0. & 0. & 0
\end{array}$$

3.
$$(\sqrt[3]{-30})^2 (-30)^{2/3}$$

Notes:

The inverse opeartion of squaring a number is taking the SQUAY 1001 of that number.

Similarly, the inverse opeartion of raising a number to the power of $\underline{\qquad}$ is taking the $\underline{\qquad}$ of that number.

We use this idea to SOINE EQUATIONS using n+n roots

Example #5: Solve the equation.

1.
$$\frac{4x^5}{9} = \frac{128}{9}$$

 $X^5 = 3Z$
 $\sqrt[3]{X^5} = \sqrt[3]{3Z}$
 $X = Z$

2.
$$(x-3)^4 = 21$$

 $-\sqrt[4]{(x-3)^4} = \sqrt[4]{21} - 7 \cdot 21^{1/4}$
 $X-3=\pm 2.14$
 $+3 + 3$
 $X=5.14, 0.80$

You practice: Solve the equation.

$$41(\frac{1}{4}x^{3})=(2) 4$$

$$X^{3} = 8$$

$$4x^{3} = 7$$

$$X = 7$$

2.
$$(x+5)^4 = 16$$

 $\sqrt[4]{(x+5)} = \sqrt[4]{16}$
 $x+5 = \pm 2$
 $-5 - 5$
 $x = -3, -7$