Using your calculator, complete the following table.

Expression	Numerical Value	Expression	Numerical Value
$(4)^{\frac{1}{2}} = ?$	2	$\sqrt[2]{4^1} = \sqrt{4} = ?$	2
$(64)^{\frac{1}{3}} = ?$	4	$\sqrt[3]{64^1} = ?$	4
$(8)^{\frac{2}{3}} = ?$	4	$\sqrt[3]{8^2} = ?$	4
$(16)^{\frac{1}{4}} = ?$	2	$\sqrt[4]{16^1} = ?$	2
$(25)^{\frac{1}{2}} = ?$	$\frac{1}{5}$.	$(\sqrt[2]{25})^{-1} = \frac{1}{\sqrt{25}} = ?$	1/5
$(2^3)^{\frac{1}{2}} = ?$	2.82	$\sqrt[2]{(2)^3} = ?$	2.82

1. What did you notice about your answers to the problems in the same rows?
the same

2. Is there some pattern that relates the two expressions in each row to one another? Describe the pattern.
numerator is the exponent
denominator is the index

3. Given the expression $(5^3)^{\frac{1}{4}}$, what expression using a root symbol would yield the same numerical value?
$5^{\frac{3}{4}} = \sqrt[4]{5^3}$

4. Given the expression $\sqrt[3]{54}$, what expression utilizing a fractional exponent would yield the same numerical value?
$54^{1/3}$

Rational Exponents

Math 2 Unit 8 Day 1 Kolbsville High School

Checkpoint Complete the following exercises.

Rewrite using rational exponents.		Rewrite using radical notation.	
a) $\sqrt[2]{7^1}$	$7^{1/2}$	d) $3^{1/2}$	$\sqrt{3}$
b) $\sqrt[3]{5}$	$5^{1/3}$	e) $14^{1/6}$	$\sqrt[6]{14}$
c) $\sqrt[5]{11}$	$11^{1/5}$	f) $4^{1/3}$	$\sqrt[3]{4}$

Checkpoint Complete the following exercises.

Evaluate an expression without a calculator

a) $\sqrt[3]{8}$ $8^{1/3} = 2$

b) $\sqrt[6]{64}$ $64^{1/6} = 2$

c) $(-27)^{1/3}$ $\sqrt[3]{-27} = -3$

Checkpoint Complete the following exercises.

Evaluate an expression with a calculator

a) $\sqrt[3]{21} = 2.759$

b) $\sqrt[6]{36} = 1.817$

c) $(-37)^{1/3} = -3.332$

* 3 decimal places! *

Solving Radical Equations

Name: _____

Rational Exponents

If the expression is in exponential form, convert to radical form.
If the expression is in radical form, convert to exponential form.

1. $x^{\frac{3}{2}} = \sqrt{x^3}$	2. $\sqrt[3]{x^4} = x^{4/3}$	3. $\sqrt[4]{x^7} = x^{7/4}$
4. $\sqrt[3]{x^4} = x^{4/3}$	5. $4x^{\frac{1}{3}} = 4\sqrt[3]{x}$	6. $100x^{\frac{1}{2}} = 100\sqrt{x}$
7. $-9y^{\frac{3}{7}} = -9\sqrt[7]{y^3}$	8. $-6\left(\sqrt[4]{x^3}\right) = -6x^{3/4}$	9. $\left(3x^{\frac{2}{3}}\right) = 3\sqrt[3]{x^2}$
10. $(4x)^{\frac{1}{2}} = \sqrt{4x}$	11. $(2x)^{\frac{9}{10}} = \sqrt[10]{(2x)^9}$	12. $\sqrt{(12x)^7} = (12x)^{7/2}$
13. $\sqrt[15]{(3x)^2} = (3x)^{2/15}$	14. $\sqrt[5]{(x^3y^2)^1} = (x^3y^2)^{1/5}$ $x^{3/5}y^{2/5}$	15. $\sqrt{2x^9} = (2x^9)^{1/2}$
16. $(6x)^{\frac{1}{5}} = \frac{\sqrt[5]{1}}{(6x)^5}$	17. $10\sqrt[5]{x^6} = 10x^{6/5}$	18. $4x^{\frac{1}{2}} = 4\sqrt{x^3}$

* Exponents before multiplication!