**Lesson 5.8 Rational Exponents**

***Goal: Explore the meaning of rational exponents***

***ACTIVITY – Exploring*** 

Examine the entries in the tables below. Determine the pattern to complete the next entries in each table.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Exponent 2** | **Exponent –2**  | **Exponent**  |  | **Exponent 3** | **Exponent –3**  | **Exponent**  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

Compare the entries in the first and second column of each table. Describe the relationship that you see.

Compare the entries in the first and third column. What do you think it means to raise a number to an exponent of ½ or ⅓?



Use your results above to define a formula for

***ACTIVITY – Exploring*** 

Examine the entries in the tables below. Use your calculator to complete each table.

To do a fractional (rational) exponent on your calculator you will need to:

* Use exponent button on your calculator (either the , , or  button)
* Use brackets around the fraction
* For example: Enter  as **25  ( 3 ÷ 2 ) =**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |
| 1 | 1 |  |  |  | 1 | 1 |  |  |
| 4 | 2 |  |  |  | 8 | 2 |  |  |
| 9 | 3 |  |  |  | 27 | 3 |  |  |
| 16 | 4 |  |  |  | 64 | 4 |  |  |

Compare the entries in the second, third, and fourth columns of each table.

How do the values of  and  relate to the values of ?

How do the values of  and  relate to the values of ?



Use your results above to define a formula for

***Summary: Conditions***

* ***Radical*** means there is a root 
* ***Rational*** means there is an exponent in fraction form

***EXAMPLE 1*** Rewrite each expression using rational exponents.

**a)  b)  c) **

***EXAMPLE 2*** Rewrite each expression in radical form and then evaluate.

**a)  b)  c) **

***EXAMPLE 3*** Solve for the unknown variable, *x*.

**a)  b)  c) **

***EXAMPLE 4*** Under annual compounding, an initial investment of $700 grows to $900 in 5 years. Determine the annual interest rate, *i*, using the compound interest formula *A* = *P*(1 + *i*)*n*.

**Practice**: Page 369 #2bde, 3 – 5 Page 376 #3ad, 5cd, 6acf, 9, 10ade, 12b, 13, 14ac