Sec 2.2 Powers of Ten and the Exponent Zero

Investigation

Power	Repeated Multiplication	Standard Form
3^5	3 x 3 x 3 x 3 x 3	243
3^4	3 x 3 x 3 x 3	81
3^3	3 x 3 x 3	27
3^2	3 x 3	9
3^1	3	3

Look for the patterns in the columns.

The exponent decreases by ___1___ each time.

Each time the exponent decreases, standard form in divided by ___3___ .

This pattern suggests that 3^0 = __1___

A power with an exponent of 0 equals __1___

Practice

1a). Complete the table below.

Power	Repeated Multiplication	Standard Form
5^5	5 x 5 x 5 x 5 x 5	3125
5^4	5 x 5 x 5 x 5	625
5^3	5 x 5 x 5	125
5^2	5 x 5	25
5^1	5	5

b) What is the value of 5^1 ? ___5___

c) What is the value of 5^0 ? ___1___

Zero Exponent Rule

Any base (excluding zero) with the exponent zero is one.

$a^0 = 1$ where $a \neq 0$

Examples: Remember, any **base** with the **exponent zero** is **one.**

1. Identify the base, then evaluate the answer.

a) 5^0 The base is 5, so $5^0 = 1$

b) 10^0 The base is 10, so $10^0 = 1$

c) $(-5)^0$ The base is -5, so $(-5)^0 = 1$

d) -10^0 The base is 10 NOT -10, therefore $-10^0 = -1$ BE CAREFUL !

2. Evaluate the following powers.
Remember the order of operations!

a) $3 + 2^0$
$= 3 + 1$
$= 4$

b) $3^0 + 2^0$
$= 1 + 1$
$= 2$

c) $(3 + 2)^0$
$= (5)^0$
$= 1$

d) $-3^0 + 2$
$= -1 + 2$
$= 1$

e) $-3^0 + (-2)^0$
$= -1 + 1$
$= 0$

f) $-(3 + 2)^0$
$= -(5)^0$
$= -1$

Writing Powers of Ten

Complete the missing values

Power	Repeated Multiplication	Standard Form	Words
10^3	10 x 10 x 10	1000	one thousand
10^5	10 x 10 x 10 x 10 x 10	100 000	one hundred thousand
10^6	10 x 10 x 10 x 10 x 10 x 10	1 000 000	one million
10^2	10 x 10	100	one hundred
10^1	10	10	ten
10^0	_____	1	one

Complete
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