

# ALGEBRA 1

## Chapter 1, Section 2

### Exponents and Powers

#### VOCABULARY:

|  |
|--|
| <ul style="list-style-type: none"><li>• Base –</li></ul>             |
| <ul style="list-style-type: none"><li>• Exponent –</li></ul>         |
| <ul style="list-style-type: none"><li>• Power –</li></ul>            |
| <ul style="list-style-type: none"><li>• Grouping Symbols –</li></ul> |

#### GOALS:

- Evaluate expressions containing exponents.
- Use exponents in models of real-life situations.

1. Evaluating Powers – this involves substituting a numerical value for a variable in a mathematical expression with a base and an exponent, either of which could be the variable.

Examples:

|                              |                              |                              |                               |
|------------------------------|------------------------------|------------------------------|-------------------------------|
| <b>a.</b> $q^3$ when $q = 5$ | <b>b.</b> $x^4$ when $x = 2$ | <b>c.</b> $5^x$ when $x = 2$ | <b>d.</b> $25^x$ when $x = 0$ |
|------------------------------|------------------------------|------------------------------|-------------------------------|

2. Evaluating an exponential expression – substitute in multiple variables in an equation.

Examples: Evaluate the following expressions when  $a = 1$  and  $b = 2$ .

|                       |                           |                             |                              |
|-----------------------|---------------------------|-----------------------------|------------------------------|
| <b>a.</b> $(a+b)^2 =$ | <b>b.</b> $(a^2)+(b^2) =$ | <b>c.</b> $(5)^a + (3)^b =$ | <b>d.</b> $(3a)^b + (b)^b =$ |
|-----------------------|---------------------------|-----------------------------|------------------------------|

3. Exponents and Grouping Symbols – make sure that you evaluate the expression using the correct order of operations (PEMDAS) to arrive at the correct answer. Check out the following examples below and see the difference.

Examples: Solve the following expressions if  $x = 4$ .

|              |                |
|--------------|----------------|
| a. $2x^3$    | b. $(2x)^3$    |
| c. $5 + x^3$ | d. $(5 + x)^3$ |

4. Real Life application of exponents

Examples: Solve the following expressions.

|   |
|---|
| a. The formula for the area of a square is $A = s^2$ . Find the area of the square if $s = 10$ feet.    |
| b. The formula for the volume of a cube is $V = s^3$ . Find the volume of the cube if $s = 6$ inches.   |
| c. The formula for the area of a square is $A = s^2$ . Find the area of the square if $s = 5.2$ inches. |
| d. The formula for the volume of a cube is $V = s^3$ . Find the volume of the cube if $s = 3.5$ feet.   |