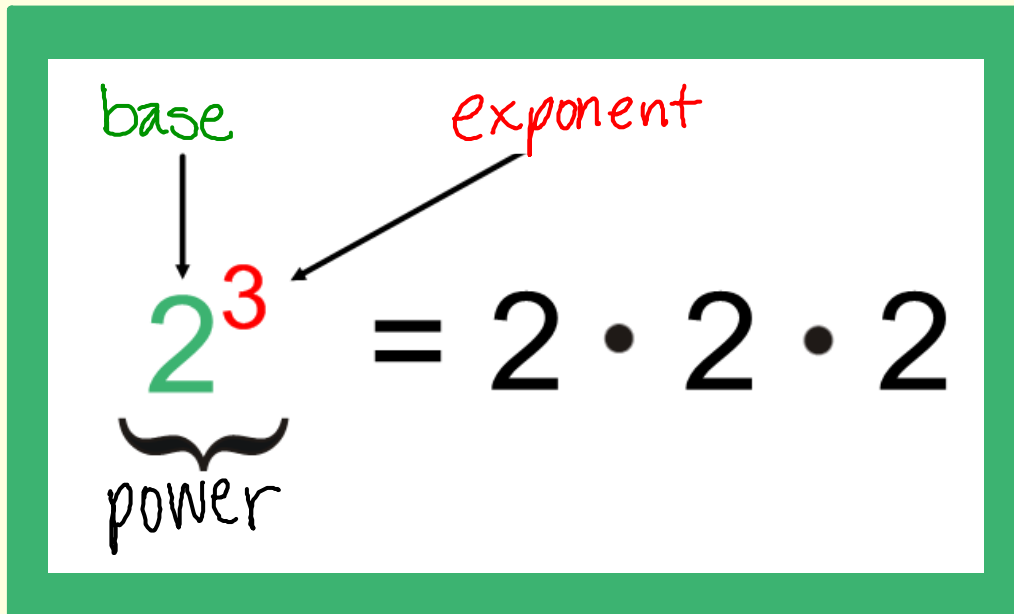


1.2 ALGEBRAIC EXPRESSIONS & MODELS



Exponential
Form

4^2

Words

four to the second
power or four
squared

Meaning

$4 \cdot 4$

8^3

eight to the third
power or eight cubed

$8 \cdot 8 \cdot 8$

x^5

x to the fifth power

$x \cdot x \cdot x \cdot x \cdot x$

EXAMPLE 1: Evaluate the following.

$$a) (-3)^4 = -3 \cdot -3 \cdot -3 \cdot -3 = 81$$

$$b) -3^4 = -3 \cdot 3 \cdot 3 \cdot 3 = -81$$

$$c) 4^4 = 4 \cdot 4 \cdot 4 \cdot 4 = 256$$

$$d) -2^5 = -2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = -32$$

$$e) 5^3 = 5 \cdot 5 \cdot 5 = 125$$

$$f) (-2)^6 = -2 \cdot -2 \cdot -2 \cdot -2 \cdot -2 \cdot -2 = 64$$

$$g) -2^6 = -2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = -64$$

ORDER OF OPERATIONS

1. Do operations that occur within grouping symbols.

 Parenthesis () and brackets []

2. Evaluate powers.

3. Do multiplication and division from left to right.

4. Do addition and subtraction from left to right.

EXAMPLES: Use the order of operations.

2. $15 + 6 \cdot 2$

$15 + 12$
 27

Variable - a letter used to represent a number

Algebraic expression - consists of variables, numbers, operations, and/or grouping symbols

Evaluate means to replace the variables with numbers and simplify.

Evaluate the variable expression when $m = 3$.

6. $m^2 - 2 \cdot 3$



10. Evaluate $-4x^2 + 6x - 5$ when $x = -3$.

11. Evaluate $2x^3 + 3x^2 + 27$ when $x = -4$.

The fraction bar is another grouping symbol. It indicates that the numerator and denominator should each be treated as a single value.

$$\frac{16 + 8}{8 - 2} \longrightarrow (16 + 8) \div (8 - 2)$$

Try $\frac{9 \cdot 4 + 2 \cdot 6}{5^2 - 1}$

12. Evaluate the variable expression when $x = 4$.

$$\frac{x - 2}{x^2 - 2 \cdot 5}$$

13. $\frac{13 - 4}{18 - 4^2 + 1}$

14. Evaluate $\frac{x^2}{2y + 1}$ when $x = -3$ and $y = 2$.

15. Evaluate $\frac{4(x - 2y)}{x + y}$ when $x = 4$ and $y = -2$.

Terms - the parts that are being added or subtracted

Coefficient - the number in front of the variable

Like terms - MUST have the same variable(s) and exponent(s)

Constant terms - numbers without variables

Example 16: Simplify by combining like terms.

a) $7x + 4x$

b) $3n^2 + n - n^2$

c) $7(x^2 - 3) - 3(x + 4)$

d) $2(x + 1) - (x + 4)$

e) $7x^2 + 12x - x^2 - 40x$