1.1: Evaluate Expressions

Goals: *Evaluate algebraic expressions using basic operations
*Evaluate algebraic expressions using exponents

Variable: a letter (or symbol) used to represent one or more numbers

Algebraic Expression: contains numbers, variables and operations

****IMPORTANT**** **NO EQUALS SIGN**

Examples of Algebraic Expressions

Ex: $5n$ Operation: Multiplication

Ex: $\frac{14}{y}$ Operation: Division

Ex: $6 + c$ Operation: Addition

To simplify an algebraic expression:

1. **Substitute (ALWAYS USE PARENTHESIS)**

2. **Simplify (Follow PEMDAS)**

Evaluate the expressions below when $n = 3$.

Ex: $13n$

39

Ex: $\frac{9}{n}$

3

Ex: $n - 1$

2

Evaluate the expressions below when $y = 2$.

Ex: $6y$

12

Ex: $y + 4$

6

Ex: $11 - y$

9

Evaluate the expressions below when $c = 4$.

Ex: $4c$

16

Ex: $\frac{8}{c}$

2

Ex: $15 + c$

19

Ex: The total cost of going to the movies can be represented by the expression $\boldsymbol{a + r}$, where a is the cost of admission and r is the cost of refreshments. Suppose you pay \$7.50 for admission and \$7.25 for refreshments, find the total cost of going to the movies.

7.50 + 7.25 = 14.75

Exponents

Power: expression that represents repeated multiplication.

Ex: $3^4 = 3 \cdot 3 \cdot 3 \cdot 3 = 81$

Say in words and write out as multiplication:

Ex: $5^2 =$

5 to the 2nd power, or 5 squared
$5 \cdot 5$

Ex: $\left(\frac{1}{2}\right)^3 =$

one-half cubed
$\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}$

Ex: $7^1 =$

7 to the 1st power
7

Ex: $x^5 =$

x to the fifth power
$x \cdot x \cdot x \cdot x \cdot x$

Evaluate the expressions for the given values.

Ex: $x^4, x = 2$

$(2)^4$
16

Ex: $n^3, n = 1.5$

$(1.5)^3$
3.375

Ex: $y^5, y = 3$

3^5
243

Ex: $x^3, x = 8$

$(8)^3$
512

Ex: $k^2, k = 2.5$

$(2.5)^2$
6.25

Ex: $d^4, d = \frac{1}{3}$

$\left(\frac{1}{3}\right)^4$
$\frac{1}{81}$

Here are some trickier ones:

Ex: -3^2

–9

Ex: x^2, when $x = -2$

$(-2)^2$
4

Ex: $-x^2$ when $x = 4$

$-(4)^2$
–(16)
–16

Ex: -5^2

–25

Ex: x^2, when $x = -6$

$(-6)^2$
36

Ex: $-x^2$ when $x = 7$

$-(7)^2$
–(49)
–49

Ex: The edge of a medium-size storage cube is 14 inches long. Find the volume of the storage cube.

$V = s^3$
$V = 14^3$
$V = 2744 \text{ in}^3$

Ex: Find the area of a square garden whose side length is 22 feet.

$A = s^2$

$A = 22^2$

$A = 484 \text{ feet}^2$