

Unit 1 – The Building Blocks of Algebra

Name: _____

CC Algebra 1

Lesson 1: Evaluating Algebraic Expressions

- Objective:** Students will be able to evaluate algebraic expressions by substituting given values and applying the order of operations.

PEMDAS

Warm Up: Apply the order of operations to simplify each expression below.

(a) $8 - \frac{1}{2} \cdot 10 + 24 \div 6$

AS → $8 - 5 + 24 \div 6$

$8 - 5 + 4$

$3 + 4 = 7$

M D
A S

(b) $\frac{1}{2}(4-12) \cdot 6$

$\frac{1}{2}(-8) \cdot 6 = \frac{-4 \cdot 6}{8} = \frac{-24}{8} = -3$

Modeling: Explain in steps what calculations occur in the expression below. Then, find its value when $x = -3$.

Expression: $8 - 2x^3$

What's happening to x ?

Calculations:

ORDER OF OPERATIONS	
(P)	Parenthesis
E ^x	Exponents
M/D	Multiply or Divide *from left to right in the problem
A/S	Add or Subtract *from left to right

Independent Task: Explain in steps what calculations are occurring in the expression below. Then, find its value when $x = -2$.

Expression: $\frac{-3x^2 + 4}{4} - 1$

What's happening to x ?

Calculations:

Group Task:

1) Robert just got a new job and plans to save 60 dollars each week. He already has 235 dollars saved from his birthday. To see how much money he will have in total, Robert came up with the expression: $60w + 235$, where w is the number of weeks that he has been saving.

(a) How much will he have saved in 3 weeks?

(b) After the first month, Robert realized that he had more money than expected due to interest that bank provided. This led him to create a better expression, $\frac{w^2}{25} + 60w + 235$, where w is the number of weeks. Based on this expression, how much will Robert have in *one year*?

2) Evaluate the following expressions for the given values of x . Show the steps in your calculation.

(a) $\frac{4(x-2)}{(x-1)}$ when $x = 0$

(b) $\frac{-3x^2+4}{4} - 1$ when $x = -2$

Extension: Evaluate the following expression for the given values of x . Show the steps in your calculation.

$$\frac{\frac{-2x}{4} + 4(x-1)}{x^2-1} \text{ when } x = 2$$

Exit Slip: What is the value of the expression $\frac{1}{2}x^3 - 32 + 7$ when $x = 4$?

Hint: Explain the steps of the calculation if you are having trouble.

Homework: Evaluating Algebraic Expressions

1. Evaluate the following expressions for the values of x given. Show all steps in your calculations.

(a) $\frac{4(x-2)}{(x-1)} + 5$ when $x = 0$.

(b) $\frac{-5x^2 + 21}{4(x-3)}$ when $x = -1$.

2. Greg received a 95 on his last math test. The only question that he got wrong is listed below.

(a) Read through Greg's work and circle his mistake.

Evaluate: $x^2 - 2(x - 3)$ when $x = 3$. Greg's work:

$$\begin{aligned} &= x^2 - 2(x - 3) \\ &= 3^2 - 2(3 - 3) \\ &= 3^2 - 2(0) \\ &= 9 - 2(0) \\ &= 7(0) \\ &= 0 \end{aligned}$$

(b) Explain what Greg did wrong.

(c) Revise Greg's work and state the correct value of the expression.