Algebra 1
Unit 1 Notes – Basic Algebraic Concepts

Essential Question:
1) How do I use order of operations to simplify real numbers?
2) How do I evaluate expressions?

I. Order of Operations

P – parenthesis (or any grouping symbol)
E – exponents
M/D - x and / from left to right!
A/S - +/- from left to right!

* On Canvas - 2 websites
- practice order of operations (pick what operation to do in the correct order)
- * Do at beginning of notes (?)

Examples:

1) $4^2 + 7 \cdot 9 \div 3$

$16 + 7 \cdot 9 \div 3$
$16 + 63 \div 3$
$16 + 21$
37

2) $2 + 16 \div 4^2 - (5 \cdot 2 - 7)$

$2 + 16 \div 16 - 3$
$2 + 1 - 3$
0

3) $\frac{4 \cdot 6 + (3^2 - 3)}{7 + 3^3 \div 3}$

$\frac{24 + 6}{7 + 27 \div 3} = \frac{30}{16} = \frac{15}{8}$ or $1\frac{7}{8}$

Now, try these with a partner:

1) $35 - 5[-8 - (-2)]$

$35 - 5(-6)$
$35 + 30$
65

2) $30 - (78 - 91)$

$30 - (-13)$
43

3) $3 + 6 \div 2 \cdot 3 - 36 \div 3^2$

$3 + 9 - 36 \div 9$
$12 - 4$
8

II. Evaluating Expressions

Variable: A letter used to represent 1 or more #'s
Algebraic Expression: An expression that contains letters #'s, & variables
Absolute Value: The distance a # is from 0 on the # line

x, $2y$, $10x^2$

SIMPLIFY expressions (solve equations)
$2x + 4$

$|3| = 3$ $|2x| = 2x$
$|-7| = 7$ $-|-5| = -5$

Examples: Evaluate each expression using the given values.

1) $m^3 - 6n^2$ when m = -2 and n = 3

$(-2)^3 - 6(3)^2$
$-8 - 54$
-62

2) $\frac{3a^2 - b}{a + 6}$ when a = -4 and b = 2

$\frac{3(-4)^2 - 2}{-4 + 6} = \frac{46}{2} = 23$

3) $|3x - 19| + 10y$ when x = 4, y = 2

$|12 - 19| + 20 = 27$

4) $4 - |x - 6| - 8$ when x = -4

$4 - |-4 - 6| - 8$
$4 - 10 - 8$
$-6 - 8$
-14

Now try these with a partner:

1) Find the value of $x^3 + 3x^2 - 2$ when x = 3

$27 + 27 - 2 = 52$

2) Evaluate $2y^2(x+y)$ when x = 1 and y = 5

$2(25)(6) = 300$
$50(6)$

3) Find the value of $2x^2 + x - 2$ when x = -2

$8 - 2 - 2$
4

4) Find the value of $|x + 8| - 3x$ when x = -1

$|7| - 3(-1)$
$7 + 3$
10

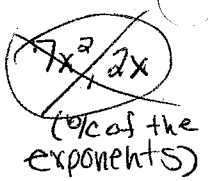
III. Combining Like Terms

Terms: $4x^2 - 2x + 6$

Coefficient: $7x^2$

Constant: A # w/o a variable — $7x + 3$

Like Terms: The variable is the same — $5x, 10x$; $2xy, 7yx$



Example: Identify the terms, like terms, coefficients, and constant terms of the expression:

$2x - 5 + 8x - 3$

Terms: $2x, -5, 8x, -3$ Like terms: $2x \& 8x$; $-5 \& -3$ Coefficients $2, 8$ Constants $-5, -3$

What does it mean to combine like terms?

add/subtract terms that have the same variable.

Examples: Combine like terms.

1) $n - 10 + 3n - 6$

$4n - 16$

2) $5x - 4 + 10 + 7x$

$12x + 6$

3) $12xy - 4x + 7yx - 9y + 3x - 17$

$19xy - x - 9y - 17$

4) $7x^2 - 5x + 3x - 2x^2 + 4y^2$

$5x^2 + 4y^2 - 2x$

5) $7xy^2 + 2y^2 - 4 + 7x^2y - 8y^2$

$7x^2y + 7xy^2 - 6y^2 - 4$

IV. Distributive Property

$a(b + c) = ab + ac$ $a(b - c) = ab - ac$

Examples:

1) $5(n + 4)$

$5n + 20$

2) $3(x - 6)$

$3x - 18$

3) $2x(x + 7)$

$2x^2 + 14x$

4) $3y(x - 5)$

$3xy - 15y$

5) $7 + 2(x + 3)$

$7 + 2x + 6$

$2x + 13$

6) $2(4x - 3) + 7(x + 5)$

$8x - 6 + 7x + 35$

$15x + 29$

7) $6 - 5(2 - 3x)$

$6 - 10 + 15x$

$15x - 4$

8) $4 + 5(x-2) - 7$

$4 + 5x - 10 - 7$

$5x - 13$

9) $7 - 2(x + 6) - (x+4)$

$7 - 2x - 12 - x - 4$

$-3x - 9$

10) $3(x - 7) - 5(x + 1)$

$3x - 21 - 5x - 5$

$-2x - 26$

Do online practice quizzes (basic algebraic concepts) pick a quiz: Substitution - eval. exp, evaluating exp. Combining like terms