

Order of Operations and Combining Like Terms

Vocab:

Expression - made up of #'s (constants or coefficients), letters (variables), and operators or grouping symbols ($()$ $+$ $-$ $[\]$)

Evaluate - simplify

Order of Operations - steps we must take to evaluate

Property - in math, statements that are always true

Like Terms - terms that have identical variable factors

Order of Operations

As we move from left to right, do the following

Parentheses

Exponents

M } multiplication & division
D }

A } addition & subtraction
S }

Ex #1 Evaluate:

$$a) 4(6-2)^2 + 1$$

$$= 4(4)^2 + 1$$

$$= 4(16) + 1$$

$$= 64 + 1 = \boxed{65}$$

$$b) 12 \div (2+1) * 6$$

$$= 12 \div (3) * 6$$

$$= 4 * 6$$

$$= \boxed{24}$$

$$c) [28 - (6+3)]^2 \cdot 2$$

$$= [28 - 9]^2 \cdot 2$$

$$= [19]^2 \cdot 2$$

$$= 361 \cdot 2 = \boxed{722}$$

Properties:

Commutative: switch the order of #s

+ / -

$$8 + 5 = 5 + 8$$

x / ÷

$$2 \cdot 3 = 3 \cdot 2$$

Associative: switch order of parentheses

+ / -

$$(3 + 2) + 6 = 3 + (2 + 6)$$

x / ÷

$$(7 \cdot 9) \cdot 3 = 7 \cdot (9 \cdot 3)$$

Additive or Multiplicative Identity: adding by 0 or multiplying by 1 doesn't change answer

+ / -

$$28 + 0 = 28$$

$$17 - 0 = 17$$

x / ÷

$$13 \cdot 1 = 13$$

$$\frac{4}{3} \cdot 1 = \frac{4}{3}$$

Additive or Multiplicative Inverses: #s that will make it add to 0 or multiply to 1.

+ / -

$$4 + (-4) = 0$$

$$-6 + 6 = 0$$

x / ÷

$$\frac{3}{2} \cdot \frac{2}{3} = 1$$

$$8 \cdot \frac{1}{8} = 1$$

Distributive: relates addition & subtraction.

w/ PEMDAS

$$3(2 + 4)$$

$$= 3(6)$$

$$= \boxed{18}$$

w/ distribution

$$3(2 + 4)$$

$$= 3(2) + 3(4)$$

$$= 6 + 12$$

$$= \boxed{18}$$

Combining Like Terms

$$\text{a) } (6a^2) + 3d - (4a^2) + 6c$$
$$= 2a^2 + 9c$$

$$\text{b) } 8r + 3c - 5r + 4c$$
$$= 3r + 7c$$

$$\text{c) } 3(3x - y) - 1(2x - 3y)$$
$$= 9x - 3y - 2x + 3y$$
$$= 7x$$

$$\text{d) } -2(f + 3g) + 5(6f - 2g)$$
$$= -2f - 6g + 30f - 10g$$
$$= 28f - 16g$$

$$\text{e) } \frac{3}{2}(2b - \frac{1}{3}a) + \frac{1}{4}(6b + a)$$
$$= \frac{3}{2}(\frac{2}{1}b - \frac{1}{3}a) + \frac{1}{4}(\frac{6}{1}b + \frac{1}{1}a)$$
$$= \frac{6}{2}b - \frac{3}{6}a + \frac{6}{4}b + \frac{1}{4}a$$
$$= \frac{6}{2}b + \frac{3}{2}b - \frac{6}{12}a + \frac{3}{12}a$$
$$= \frac{9}{2}b - \frac{3}{12}a$$
$$= \frac{9}{2}b - \frac{1}{4}a$$

X or $\frac{1}{}$
do it to top &
bottom
+ or -
get common
denominators &
only do the
top