

ALG 1: RATIONAL NUMBERS

Mon 8/20

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Objectives: The students will be able to combine like terms to simplify variable expressions.

Combining Like Terms

In an expression, the **terms** are the elements separated by the plus or minus sign. A **coefficient** is the number being multiplied by a variable.

3 is the coefficient

3 a

a is the variable

3a is a term.

b is a term.

-5 is a term.

$$3a + b - 5$$

$$3a + b + (-5)$$

-5 is a **constant** b/c there is no variable beside it.

Like terms have the same variable(s).

$$2x + 3y + 4x - 5y$$

2x and 4x are like terms.

3y and -5y are like terms.

You can add like terms by adding their coefficients.

$$2x + 4x = 6x$$

and

$$3y + (-5y) = -2y$$

So you can simplify $2x + 3y + 4x - 5y = 6x - 2y$

Practice

Problem 1. $2x + 3y + z$ ← 3 terms

- a) What number is the coefficient of x? 2
 b) What number is the coefficient of y? 3
 c) What number is the coefficient of z? 1

Typically, you do not write the coefficients 1 or -1.
 $1x = x$
 $-1x = -x$

Problem 2. $5x - 4y - z$ (hint: change the subtraction to plus the opposite) ← 3 terms

- a) What number is the coefficient of x? 5
 b) What number is the coefficient of y? -4
 c) What number is the coefficient of z? -1
- $$5x + (-4y) + (-z)$$



Problem 3. Add like terms.

a) $6x + 2x = 8x$ b) $6x - 2x = 4x$ c) $5x + 1x = 6x$

d) $5x - 1x = 4x$ e) $-4x + 5x = x$ f) $4x - 5x = -x$ g) $4x + (-5x)$

g) $-5x - 3x = -8x$ h) $-x - x = -2x$
 $-5x + (-3x)$ $-x + (-x)$

i) $-3x - 4 + 2x + 6 = -x + 2$
 $-3x + (-4) + 2x + 6$

j) $4x + y - 2x + 3z = 2x + y + 3z$
 $4x + y + (-2x) + 3z$

k) $x - 2 - 4x - 5 = -3x - 7$
 $x + (-2) + (-4x) + (-5)$

l) $\frac{3}{5}x + \frac{1}{2}y + \frac{1}{4}x$
 (on paper)

m) $3x - y - 8x + 2y = -5x + y$
 $3x + (-y) + (-8x) + 2y$

n) $\frac{5}{4}p + \frac{2}{3} - \frac{1}{4}p$
 (on paper)

o) $-\frac{2}{3}x - (-\frac{1}{5}x) + (-\frac{7}{9}) = -\frac{7}{15}x + (-\frac{7}{9})$
 (on paper) 3 terms 2 terms

8/20 problems worked on paper!

71)

$$\frac{3}{5}x + \frac{1}{9}y + \frac{3}{4}x$$

$$\frac{3 \cdot 4}{5} + \frac{3 \cdot 5}{4}$$

$$\frac{12+15}{20} = \frac{27}{20} = 1\frac{7}{20}$$

$$= 1\frac{7}{20}x + \frac{1}{9}y$$

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8)

$$\frac{5}{4}p + \frac{2}{3} - \frac{1}{4}p$$

$$p + \frac{2}{3}$$

$$\frac{5}{4} + \left(-\frac{1}{4}\right) = \frac{4}{4} = 1$$

$$9) -\frac{1}{7}a + \frac{5}{6}a - \frac{2}{3}$$

$$\frac{29}{42}a - \frac{2}{3}$$

$$-\frac{1 \cdot 6}{7} + \frac{5 \cdot 7}{6}$$

$$-\frac{6+35}{42} = \frac{29}{42}$$

$$9) -\frac{2}{3}x - \left(-\frac{1}{5}x\right) + -\frac{7}{9}$$

$$-\frac{7}{15}x + \left(-\frac{7}{9}\right)$$

$$-\frac{2 \cdot 5}{3} + \frac{1 \cdot 3}{5}$$

$$\frac{-10+3}{15} = -\frac{7}{15}$$