

### Simplifying Expressions

- Expressions (do/do not) have equal signs so you cannot solve them. You can only evaluate (or simplify) them.
- When you evaluate an expression you combine like terms.

<p>A <b>variable</b> is <u>a symbol (or a letter) used for an unknown value</u>. This expression has <u>4</u> variables. <u>a, c, v, g</u></p>	<p>A <b>coefficient</b> is <u>the numerical factor of a term (the # in front of a term)</u>. There are <u>4</u> coefficients in this expression. <u>12, 5, -9, 1</u></p>
<div style="background-color: #cccccc; padding: 5px; display: inline-block; border-radius: 10px;"><b><math>12a + 5c - 9v - 10 + g</math></b></div>	
<p>A <b>constant</b> is <u>a real number</u>. Constants <u>are NOT variables</u>. This expression has <u>1</u> constant, <u>-10</u>.</p>	<p>A <b>term</b> is <u>a single number or variable or a number and variable multiplied</u>. Terms are separated by <u>+ or -</u>. This expression has <u>5</u> terms. <u>12a, 5c, -9v, -10, g</u></p>

You try!

$-6x + 2 + 7f + 7 + 1.4g$

Terms? (how many groups)	<u>5</u>
Coefficients? (a number multiplied by a variable)	<u>3</u>
Constants? (a number that is by itself)	<u>2</u>
Variables? (symbol or Letter)	<u>3</u>

$9 + 7x - 4y - 3 - 8j + \frac{1}{2}x$

Terms? (how many groups)	<u>6</u>
Coefficients? (a number multiplied by a variable)	<u>4</u>
Constants? (a number that is by itself)	<u>2</u>
Variables? (symbol or Letter)	<u>3</u>

$x + 3x - 2 - y$

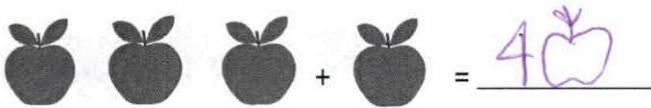
Terms? (how many groups)	<u>4</u>
Coefficients? (a number multiplied by a variable)	<u>3</u>
Constants? (a number that is by itself)	<u>1</u>
Variables? (symbol or Letter)	<u>2</u>



**Partner Practice:** Identify all coefficients, constants, terms, and variables in the expressions below.

<p>1) <math>1 + 2x - 3x + 4 - 5x</math></p> <p>Terms: 5</p> <p>Coefficients: 2, -3, -5</p> <p>Constants: 1, 4</p> <p>Variables: x</p>	<p>2) <math>-6 + 8 - 10x + 12 - x</math></p> <p>Terms: 5</p> <p>Coefficients: -10, -1</p> <p>Constants: -6, 8, 12</p> <p>Variables: x</p>
<p>3) <math>x + y + z + u</math></p> <p>Terms: 4</p> <p>Coefficients: 1</p> <p>Constants: 0</p> <p>Variables: x, y, z, u</p>	<p>4) <math>4x + 1y - 7x</math></p> <p>Terms: 3</p> <p>Coefficients: 4, 1, -7</p> <p>Constants: 0</p> <p>Variables: x, y</p>
<p>5) <math>-x^2 + 2 + x^7 - 9</math></p> <p>Terms: 4</p> <p>Coefficients: -1, 1</p> <p>Constants: 2, -9</p> <p>Variables: <math>x^2, x^7</math></p>	<p>6) <math>4x - 9 + 2 - 1x + 7x^3 - 1</math></p> <p>Terms: 6</p> <p>Coefficients: 4, -1, 7</p> <p>Constants: -9, 2, -1</p> <p>Variables: x, <math>x^3</math></p>

Part Two:



• 2 cats + 3 cats = 5 cats

• 7 dimes + 10 pencils = 7 dimes

• 3 cats + 5 dogs = 5 dogs

• 2 cars + 4 cars = 6 cars



**Main Idea → Combining Like Terms**

- Like terms are terms with the same variables and powers.
- You can simplify an algebraic expression by combining like terms that have the same variable and exponent.

<p>1. <math>(11) + 6x - x^2 - x + 3x^2 - 4</math></p> $-x^2 + 3x^2 + 6x - x + 11 - 4 = 2x^2 + 5x + 7$
<p>2. <math>-2x^2 + 5 - 4x + 1 - 3x^2 + 7</math></p> $-2x^2 - 3x^2 - 4x + 5 + 1 + 7 = -5x^2 - 4x + 13$
<p>3. <math>3x - 5y + x^2 - 2 + 8y + 4x - x^2</math></p> $x^2 - x^2 + 3x + 4x - 5y + 8y - 2 = 7x + 3y - 2$

**You Try!**

<p>1) <math>-g + 4 - 5g + 7 - 12</math></p> $-6g - 1$	<p>2) <math>y + 6 - 1.5(-y) + 17 - 5y</math></p> $-5y + 21.5$	<p>3) <math>2m + 3y - 7m + 3y - 2y - m - m</math></p> $7m + 4y$
<p>4) <math>10 - 6y^2 - 0 + 6y - 4y^2 + 2 - y</math></p> $-10y^2 + 5y + 12$	<p>5) <math>j^2 + 2j^2 - 10j + 1 - (-5j) - j^2</math></p> $2j^2 - 5j + 1$	<p>6) <math>4y - 2 + 9y^2 - 11 + 2y + 18</math></p> $9y^2 + 6y + 5$



*all sides are equal*

7. An equilateral triangle has a perimeter of  $6x + 3$  centimeters. Write an expression that correctly represents the length of one side of the triangle.



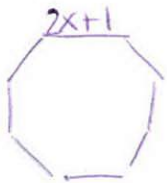
$$\frac{6x+3}{3} = \frac{6x}{3} + \frac{3}{3} = \frac{6}{3}x + \frac{3}{3} = \underline{2x+1}$$

8. Jayden walked a total of  $12x+5r-8$  miles on Monday and Tuesday. If he walked  $7x-10r$  miles on Monday, how many miles did he walk on Tuesday?

$$12x+5r-8 - (7x-10r)$$

$$\underline{12x} + \underline{5r} - 8 - \underline{7x} + \underline{10r} = 5x + 15r + 8 \text{ miles}$$

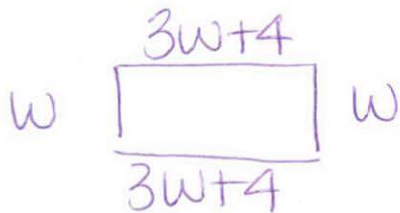
9. A stop sign is in the shape of an octagon. Find the perimeter if each side is  $2a + 1$  units.



$$\underline{2a+1} + \underline{2a+1} + \underline{2a+1} + \underline{2a+1} + \underline{2a+1} + \underline{2a+1} + \underline{2a+1} + \underline{2a+1} = \underline{16a+8}$$

$$\text{OR} = 8(2a+1) = 16a+8$$

10. Write the expression for the perimeter of a rectangle with a length that is 4 centimeters longer than three times its width.



$$3w+4 + 3w+4 + w + w =$$

$$\underline{8w+8}$$

Homework:

