

## Beginning Algebra ~ Lesson 18

Work the following examples as you listen to the recorded lecture.

### Linear Equations in Two Variables

A linear equation in two variables represents a straight line. The equation can be written like this:  $Ax + By = C$  where  $A$ ,  $B$ , and  $C$  are real numbers and  $A$  and  $B$  are **not both** zero.

<b>Remember....</b>
A Linear Equation in Two Variables <i>must</i> have:
1. An equal sign
2. An $x$ term or a $y$ term, but no other variable terms
3. No exponents of $x$ or $y$ other than 1
4. Only real numbers

Everything else is flexible and optional. In other words, linear equations in two variables can take many shapes. Take a look at the following examples:

<u>Linear Equation Examples</u>	<u>Values</u>	<u>Explanation</u>
$2x + 3y = 4$	$A = 2, B = 3, C = 4$	The format is the same as our model.
$2x = 4$ $3y = 4$ $2x + 3y = 0$	$A = 2, B = 0, C = 4$ $A = 0, B = 3, C = 4$ $A = 2, B = 3, C = 0$	The equation looks different to us if one of the numbers is 0. The $x$ or $y$ term may be missing because of a coefficient of 0. The equation still fits the model. Either $A$ or $B$ can be 0, but not both. $C$ can always be 0.
$-2x - \frac{1}{3}y = 0.4$	$A = -2, B = -\frac{1}{3}, C = .4$	Any of our numbers can be negative, decimals, or fractions.
$2x = 4 - 3y$	$A = 2, B = -3, C = 4$	The terms can be written in any order in the equation.

What about equations that are **not** linear equations in two variables? Take a look at the following bad examples:

<u>Bad Linear Equation Examples</u>	<u>Explanation</u>
$2x^2 + 3y = 4$	The $x^2$ term is not allowed.
$2x = \sqrt{-3}$	$\sqrt{-3}$ is not a real number.
$-2x - 3y + 5z = 4$	There is a third variable term, $5z$ .
$2n = 4 - 3n$	There must be an $x$ or $y$ term.