

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.

Remember....
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.

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Fill in the chart below. In the first column is either a good example or a bad example of a linear equation in two variables. Circle Good or Bad in the second column to indicate which equations fit the criteria. In the third column, give the A , B , and C values for Good examples and explain why Bad examples do not fit the criteria.

<u>Equation Examples</u>	<u>Good or Bad?</u>	<u>Why is this a Good or Bad example of a Linear Equation?</u>
$-x + 2y = 17$	Good	$A = \underline{\quad}, B = \underline{\quad}, C = \underline{\quad}$
	Bad	Why?
$2x = 4z$	Good	$A = \underline{\quad}, B = \underline{\quad}, C = \underline{\quad}$
	Bad	Why?
$\frac{1}{2}y = 4$	Good	$A = \underline{\quad}, B = \underline{\quad}, C = \underline{\quad}$
	Bad	Why?
$0.5y = 4 - 0.5x$	Good	$A = \underline{\quad}, B = \underline{\quad}, C = \underline{\quad}$
	Bad	Why?