MAT0028 ~ 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 *must* 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:

Linear Equation Examples	Values	Explanation
$2x + 3y = 4$	*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:

Bad Linear Equation Examples	Explanation
$2x^2 + 3y = 4$	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.

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