1.6 Functions

Study 1.6
5-27, 14, 31-41, 47-53

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Homework Problems

1.6 Functions

Algebra: Language of Science

1. Use variables to represent things that change in amounts:
   - Independent Variable (usually x)
   - Dependent Variable (usually y)
2. Verbs: $=$, $<$, $>$, $\leq$, $\geq$
3. Equations: sentences that are rules for mathematical operations applied to the independent variable to obtain the dependent variable.

eg: Linear equation: $y = 2x + 1$

The rule is: select a value (x)
multiply by 2
add 1

What is the rule for: $y = 3x - 4$?

_____
_____
_____

1.6 Functions

Definitions:

Relation: set of ordered pairs

Domain: all of the values of the independent variable that result in a real number for the dependent variable

Range: values of the dependent variable

FUNCTION: Relation in which each value of the independent variable results in **exactly one value** of the dependent variable.

$y = 2x - 2$

$y = -(1/3)x + 0.1$

$3y - 2x = 2$

$y + x = 2x - 2$

$y = 4$

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geogebra, interactive: slope-intercept form, y = mx + b
http://www.battaly.com/collegealgebra/geogebra/slopeIntercept/

1.6 Functions

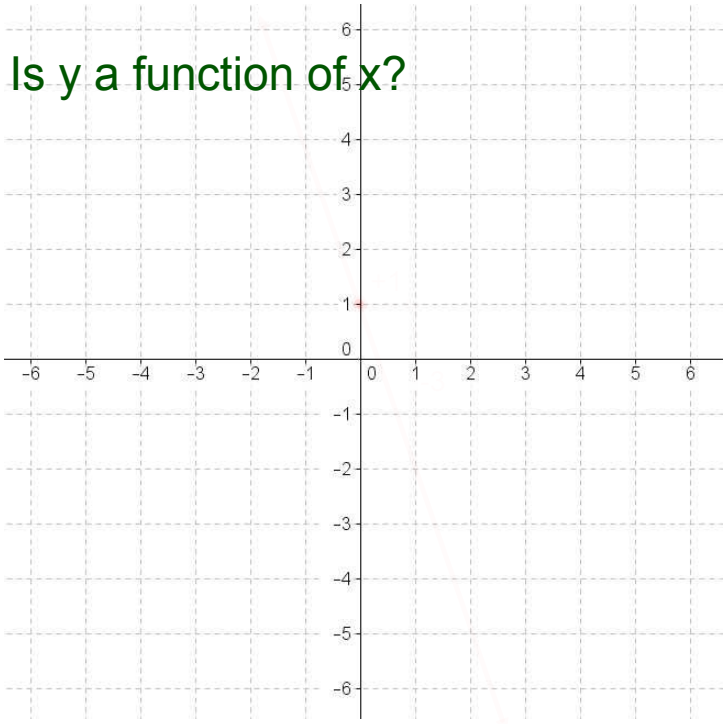
Are linear equations functions?

1. For equations of the form y = mx + b
   is y a function of x? (m, b constants)

2. Are there any lines for which
   y is NOT a function of x?

1.6 Functions

Given: $y = -3x + 1$ Find: Is y a function of x?



1. Start with a sketch:
   y-intercept: (0, 1)
   $m = -3 = \frac{\Delta y}{\Delta x} = \frac{-3}{+1}$

2. Use vertical line test:
   Does a vertical line intersect the graph at more than one point?

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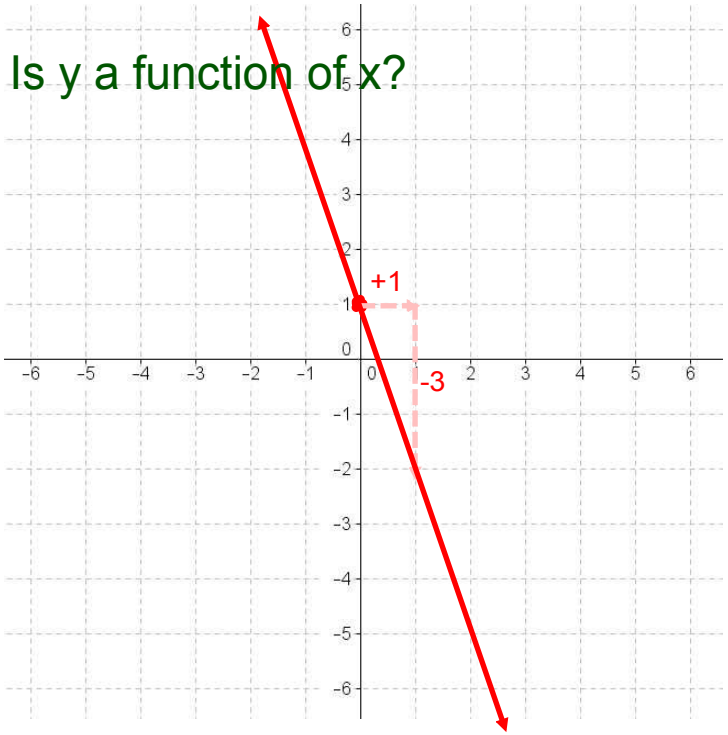

1. Start with a sketch:
   y-intercept: (0, 1)
   $m = -3 = \frac{\Delta y}{\Delta x} = \frac{-3}{+1}$

2. Use vertical line test:
   Does a vertical line intersect the graph at more than one point?

Passes vertical line test:
A vertical line does NOT intersect the graph at more than one point?

Therefore, YES, y is a function of x.

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1.6 Functions

G: $2x + 5y = 9 - 4(x + 2y) - 3x + 1$

F: Is y a function of x?

Every value of x in the domain results in exactly one value of y.

Therefore, YES, y is a function of x.

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