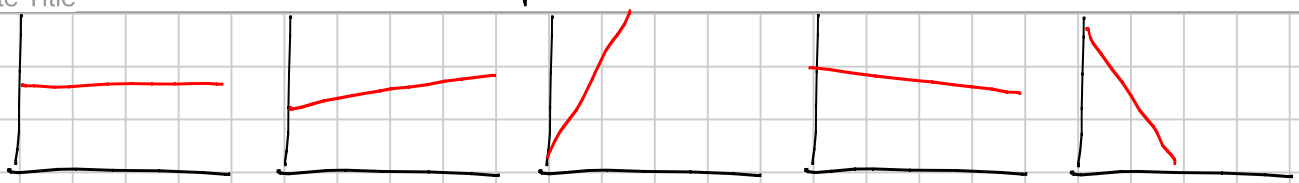
Math 10 Chp 6 Reference/Review

Note Title 2017-01-11



no change | slow increase | fast increase | slow decrease | fast decrease

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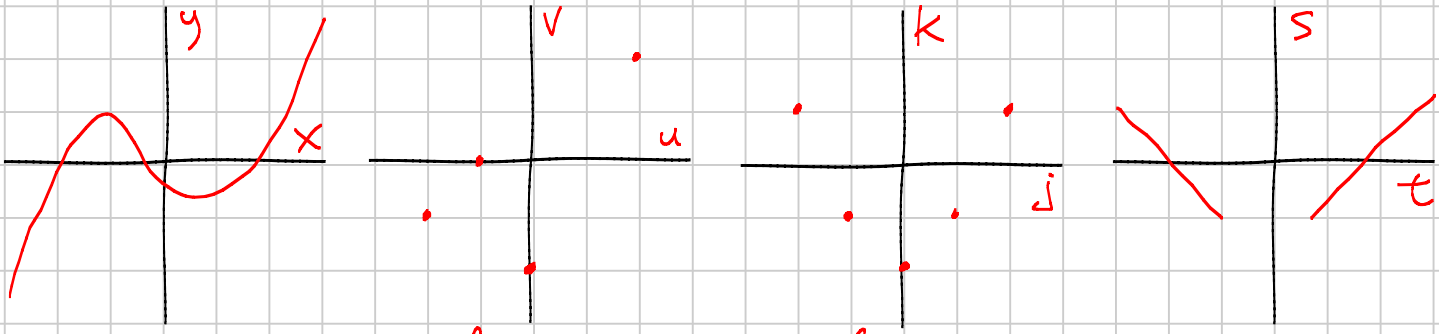
The vertical axis is called the dependent variable. The horizontal axis is called the independent variable (or control). We frequently see the horizontal axis is time; time is rarely on the vertical axis.

linear | non-linear | non-linear | linear

$y = -\frac{2}{3}x + 1$ $\quad v = -(u+1)^2 + 3$ $\quad k = -(j+5)(j+2)(j-3)(j-7)$ $\quad s = t$

Usually, we write the relation explicitly for the dependent variable.

The next concept for relations is continuity.
If the relation is made up of points, it is discrete.
If the relation is made up of curves, it is continuous.



Continuous | discrete | discrete | continuous

Algebraically showing a linear relation - if we have an equation, there will be one or two variables and each term will be degree 0 or 1. The degree is the sum of the exponents for the variables in a term.

Another algebraic way is to determine the slope between points. If any of the slopes are different, then it is non-linear. To show linear, you must do the slope between ALL points.

Alternatively, you can plot all the points to see if they form a line.

Domain and Range - is another concept that applies to relations. Domain is simply the acceptable values for the independent variable. Range is all the calcalated or measured values of the dependent variable.

Notations

Inequality: eg) $0 \leq x \leq 100$, $-50 \leq y < 2$, $x > 25$

Interval: eg) $x \in [0, 100]$, $y \in [-50, 2)$, $x \in (25, \infty)$

Set: eg) $x \in \{-3, -1, 1, 4\}$, $y \in \{-3, -2, -1, 0, 1, \ldots\}$

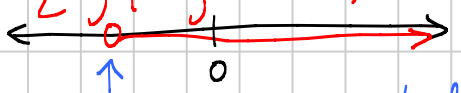
$x \in \mathbb{R}$ - reals, $y \in \mathbb{Z}$ - integers, $x \in \mathbb{N}_0$ - naturals with 0

Set Builder: eg) $\{x \mid 0 \leq x \leq 100, x \in \mathbb{R}\}$

$\{y \mid -50 \leq y < 2, y \in \mathbb{R}\}$

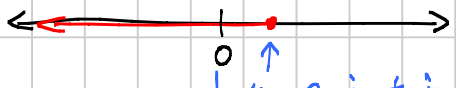
$\{y \mid y = n - 3, n \in \mathbb{N}_0\}$

Number Line: x



circle - point not included

y



dot - point included

Functions - a function is a relation, but a relation is not necessarily a function. The property that makes a function different from a relation is a function gives only one dependent value for each independent value.

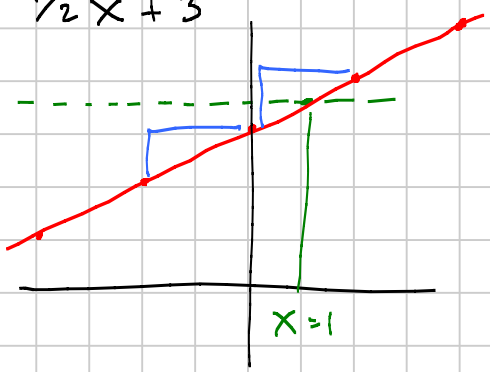
Vertical Line Test: If anywhere on the relation, a vertical line passes through 2 or more points, the relation is not a function.

Function Notation- $y = 3x+4$ becomes $y(x) = 3x+4$.
Fn notation makes it clear what are the independent variables and what is the dependent variable.
We can use a function simply by substituting values.

Recall graphing and solving linear relations from last year.

1. Graphing from table of values. $y = \frac{1}{2}x + 3$

x	y
0	3
2	4
-2	2
4	5
-4	1



2. Graphing from slope-intercept form.

Recall finding solutions

1. From graph. $3.5 = \frac{1}{2}x + 3$

2. Algebraically: $3.5 = \frac{1}{2}x + 3$
$.5 = \frac{1}{2}x$
$x = 1$

Slope - simply means change. It is the ratio of the change in dependent variable vs. the change in independent variable. $m = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

If the slope >0 (positive), then the dependent variable is increasing. Conversely, if the slope <0 (negative), then the dependent variable is decreasing.
By convention, the sign of the slope goes with the rise; the run is considered positive and goes to the right.
When calculating just the rise or run the order of the points MATTERS. ie $y_2 - y_1$ or $x_2 - x_1$
When calculating the slope, the order of the points DON'T matter.


zero slope


no slope