

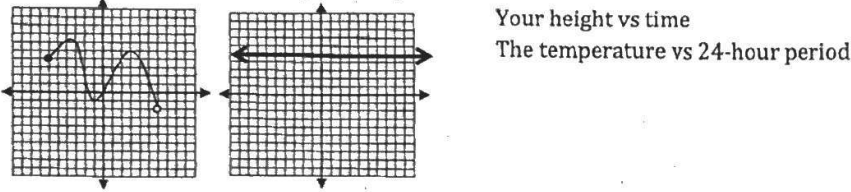
**Introduction to Relations and Functions: Vocabulary "Must Knows"**

**Independent Variable** - "x" - (the cause): The input of a relation or function

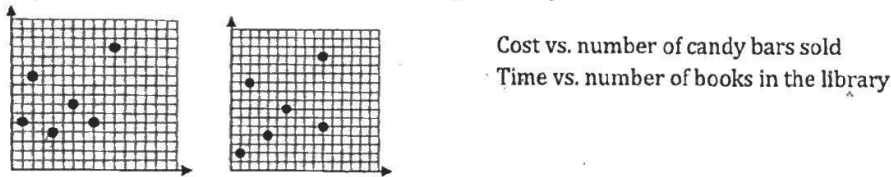
**Dependent Variable** - "y" - (the result): The output of a relation or function

Grades (dependent variable) DEPENDS ON time studying (independent variable)  
IS A FUNCTION OF

**Continuous Data** data that are measured "continuously" such as temperature, weight, time, etc. The graphs are represented by lines or curves (all points are connected). Allows for intervals "between" data (fractions).



**Discrete Data** data that are given as "distinct" values such as objects, people, etc and can be counted. These graphs are represented by individual points and cannot be connected. It does NOT allow for interval "between" data (fractions).

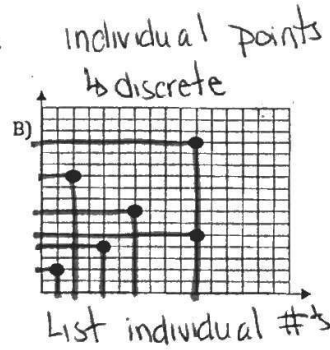
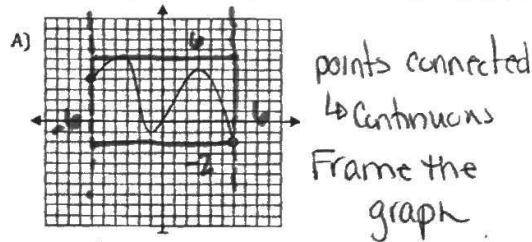


**Domain** the set of FIRST coordinates in an ordered pair.

AKA: x-values, independent variable, input, cause

**Range** The set of SECOND coordinates in an ordered pair.

AKA: y-values, dependent variable, output, result



$D: \{1, 2, 4, 6, 10\}$

$R: \{2, 4, 5, 7, 10, 13\}$

Continuous

$D: -6 \leq x < 6$

$R: -2 < y \leq 6$

**Relation:** A set of ordered pair  $\{(3, -2), (5, -1), (4, 0), (3, 1)\}$

**Function:** A special type of relation that pairs each domain value(x) with ONLY ONE range value(y).

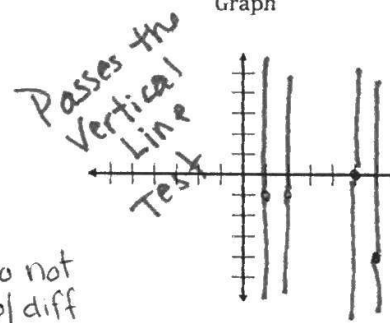
→ x-values CANNOT repeat with different y-values

Ex 1:  $\{(6, -4), (5, 0), (2, -1), (1, -1)\}$  **Function**

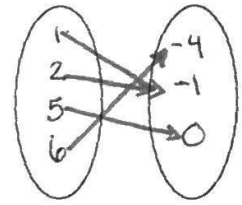
Table

x	y
6	-4
5	0
2	-1
1	-1

Graph



Mapping



All x-values only correspond to 1 y-value

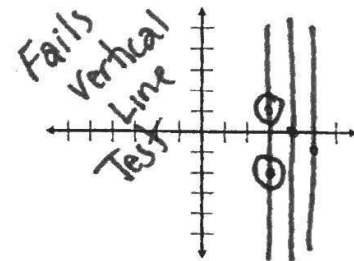
x-values do not repeat w/ diff y-values

Ex2:  $\{(3, -2), (5, -1), (4, 0), (3, 1)\}$  **Not a function**

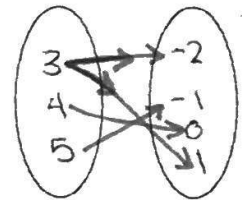
Table

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

Graph



Mapping



3 corresponds to -2 + 1

3 is paired with 2 different y-values  
 $1 + -2$

**Notes: Identifying Linear Functions**

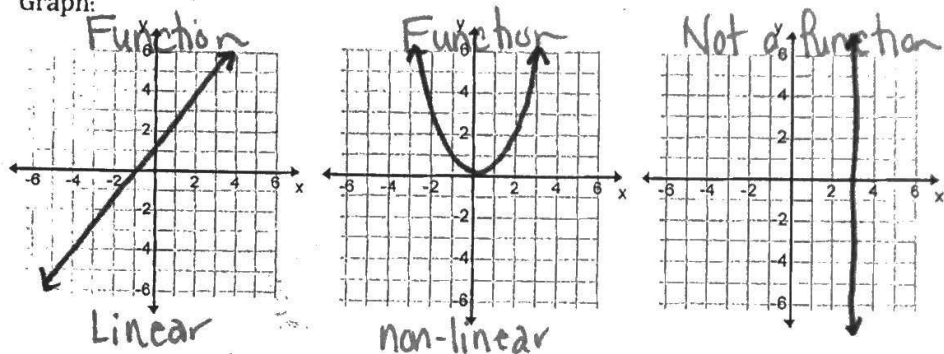
A Linear Function is a function with a constant rate of change (slope, rise/run,  $\Delta y/\Delta x$ )

Always ask yourself:

Is it a function? If no  $\rightarrow$  for now, don't worry about it! 😊

Is it a function? If yes  $\rightarrow$  Is it a LINEAR FUNCTION?

Graph:



Tables:

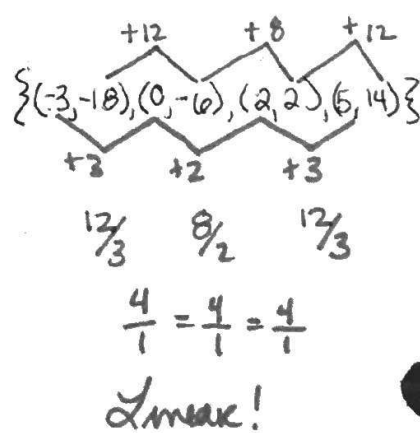
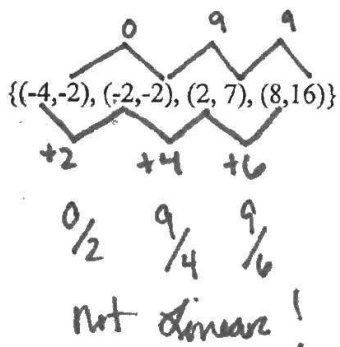
	x	y	
+1	-2	7	-3
+1	-1	4	-3
+1	0	1	-3
+1	1	-2	-3

$\Delta y/\Delta x = -3/1$   
Linear

	x	y	
+5	10	3	+3
+5	15	6	+3
+5	25	9	+3
+5	30	12	+3

$\Delta y/\Delta x = 3/5$   
not linear

Ordered Pair



Verbal Description: Constant Rate of Change

A cab company charges a fixed fee of \$2.00 plus \$3.50 per mile

Sally works a summer job and is paid \$8.00 per hour

Equation:

- 1) x and y cannot be multiplied together
- 2) x cannot be in the denominator
- 3) x cannot be an exponent
- 4) no exponents greater than 1

$3x + 1 = y$   
Linear

$5x + 3y = 15$   
Linear

$x^2 + y = 2$   
not linear (4)

$\frac{10}{x} = y$   
not linear (2)

$y = 2^x$   
not linear (3)

$\frac{x}{5} + 6 = y$   
Linear

Identify the Linear Functions. If it is not a Linear Function, explain why.

Your pay is doubled every day.	$\{(-10,0), (-5,0), (0,0), (5,0)\}$	$3xy = 15$										
		<table border="1"> <thead> <tr> <th>x</th> <th>-3</th> <th>0</th> <th>2</th> <th>6</th> </tr> </thead> <tbody> <tr> <th>y</th> <td>-14</td> <td>1</td> <td>11</td> <td>31</td> </tr> </tbody> </table>	x	-3	0	2	6	y	-14	1	11	31
x	-3	0	2	6								
y	-14	1	11	31								
$\{(-4,12), (2,-9), (4,-8), (8,-6)\}$	$\frac{x}{4} + \frac{1}{2}y = 12$	A phone company charges a flat fee of \$30 plus \$0.10 per text message.										