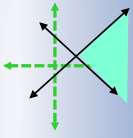
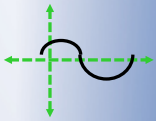


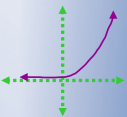
$$5x - 2y \leq 75$$



$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}$$



$$S = Pe^{rt}$$



$$APY = \left(1 + \frac{r}{n}\right)^n - 1$$

Math 1090 ~ Business Algebra

Section 1.5 Functions

Objectives:

- Identify relations that are functions.
- Use the vertical line test to distinguish a function.
- Determine the domain and range of a function.
- Evaluate a function or relation at a given input value or expression.

relation

vs

function

a rule that gives output(s) for given input

a relation that assigns exactly one output to every allowable input

domain: set of all allowable inputs

range: set of outputs

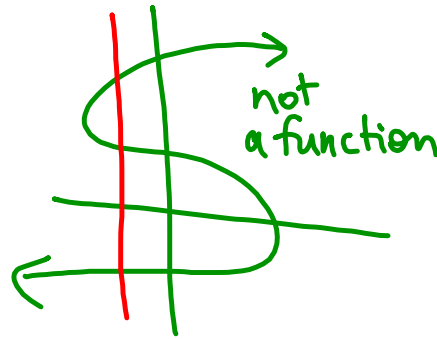
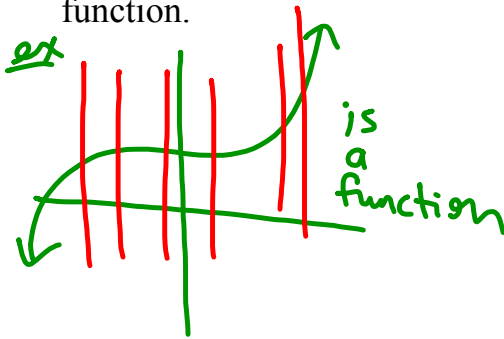
Ex 1: Which of these relations are functions?

- | | | |
|--------------------------------|--|----------|
| a) ^{input} x = person | ^{output} y = car owned by that person | relation |
| b) x = person | y = their kid | relation |
| c) x = puppy | y = mother | function |
| d) x = student | y = grade in math 1090 class | function |

Vertical line test

(x,y) (input, output)

If we graph all the ordered pairs of a relation on a Cartesian coordinate system, and every vertical line goes through the graph at most one time, then it is a function.



Ex 2: Are these functions? Identify the domain.

a) $y = f(x) = 6x^2$
domain: $x \in \mathbb{R}$

$y = 6x^2$ for every input, we have only one output \Rightarrow it's a function

b) $y^2 = 4x^2$

x	y
1	± 2

domain: $x \in \mathbb{R}$

$y^2 = 4$ \Rightarrow for a given input of $x=1$, we get 2 possible outputs for y ($y=2$ or $y=-2$) \Rightarrow this is a relation (NOT a fn)

Ex 3: Given $f(x) = 4x^2 - 5x$ find

a) $f(-2) = 4(-2)^2 - 5(-2)$ c) the domain : $x \in \mathbb{R}$

$$= 4(4) - (-10)$$
$$= 16 + 10 = 26$$

b) $f(2) = 4(2^2) - 5(2)$

$$= 4(4) - 10$$

$$= 16 - 10 = 6$$

d) $f(w) = 4w^2 - 5w$

Ex 4: For $f(x) = \frac{x+3}{x-2}$ find

a) $f(1) = \frac{1+3}{1-2}$

$$= \frac{4}{-1} = -4$$

c) the domain

$$x \in \mathbb{R}, x \neq 2$$

b) $f\left(\frac{2w+1}{w-1}\right) = \frac{\left(\frac{2w+1}{w-1}\right) + 3}{\left(\frac{2w+1}{w-1}\right) - 2}$

Ex 5: Find the domain.

a) $f(x) = \sqrt{2x-1}$

$$2x-1 \geq 0$$

$$2x \geq 1$$

$$x \geq \frac{1}{2}, x \in \mathbb{R}$$

b) $g(x) = \frac{3}{x^2-25} = \frac{3}{(x-5)(x+5)}$

$$x \in \mathbb{R}, x \neq 5, -5$$