Functions

What is a function?



4 Ways to Represent a Function:

1. Verbally ()	2. Analytically ()
Ex: Favorite Ice Cream Flavor		,	Ex: $f(x) = 3x - 4$ or $y = 3x - 4$
3. Numerically ())	4. Visually ()
Ex: Ball Bounce			Ex: EKG Reading
Drop	Bounce		
$\frac{\text{Height (in)}}{26}$	$\frac{\text{Height (in)}}{25.0}$		
36	25.0		
40	29.0		
44	31.5		I alamala il a alam
48	35.0		
52	37.5		
56	42.0		
60	46.5		100 00000-0000 apren:25 mm/sec 1.1mb:1

Independent Variable:

Dependent Variable:

Many functions represented in all 4 ways: Ex: Words:

Equation: y = 3x - 4

Table:

Graph:

Functions Which of the following graphs represent functions?



Why?

Forms of Functions

 $x^2 + 2y = 1$

$$y = \frac{1}{2}(1-x^2)$$

 $f(x) = \frac{1}{2}(1 - x^2)$

<u>Ex</u>: Find f(-3)

<u>Ex</u>: Find f(4x)

Ex: Given
$$f(x) = x^2$$
, find and simplify $\frac{f(x+\Delta x)-f(x)}{\Delta x}$

Functions

Domain and Range:

Domain:

Natural/Implicit Domain

Range:

Ex: State the domain and range for the following functions:

a)
$$f(x) = x^2$$
 c) $f(x) = \frac{1}{x+1}$

b)
$$f(x) = \sqrt{x}$$
 d) $f(x) = \frac{1}{\sqrt{x+1}}$

Piecewise Function:



Domain:

Range:

When is the function increasing?

When is the function decreasing?

Ex: Given $f(x) = \begin{cases} x, & x \ge 0 \\ -x, & x < 0 \end{cases}$

- a) Make a table of values and sketch the function
- b) What is the domain and range?
- c) Do you recognize this function? If so, what is it?

Symmetry:

Even Functions

Odd Functions

Ex: Without using a graph, determine whether the following functions are odd, even, or neither.

a) $f(x) = x - x^2$

b) $f(x) = x^3 + x$