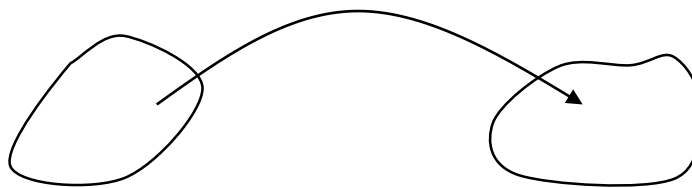


Functions

What is a function?



4 Ways to Represent a Function:

1. Verbally ()

Ex: Favorite Ice Cream Flavor

2. Analytically ()

Ex: $f(x) = 3x - 4$ or $y = 3x - 4$

3. Numerically ()

Ex: Ball Bounce

Drop Height (in)	Bounce Height (in)
36	25.0
40	29.0
44	31.5
48	35.0
52	37.5
56	42.0
60	46.5

4. Visually ()

Ex: EKG Reading



Independent Variable:

Dependent Variable:

Many functions represented in all 4 ways:

Ex: Words:

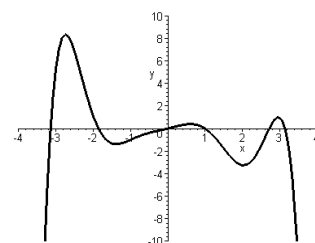
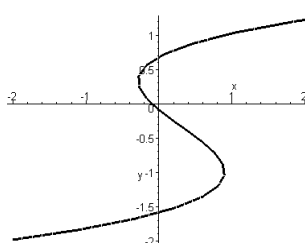
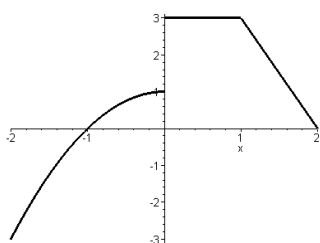
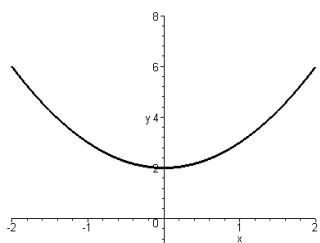
Equation: $y = 3x - 4$

Table:

Graph:

Functions

Which of the following graphs represent functions?



Why?

Forms of Functions

$$x^2 + 2y = 1$$

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

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

Ex: Find $f(-3)$

Ex: 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:

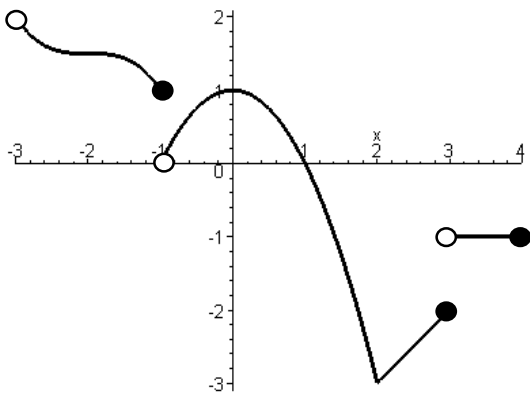
a) $f(x) = x^2$

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 $f(x) = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$

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