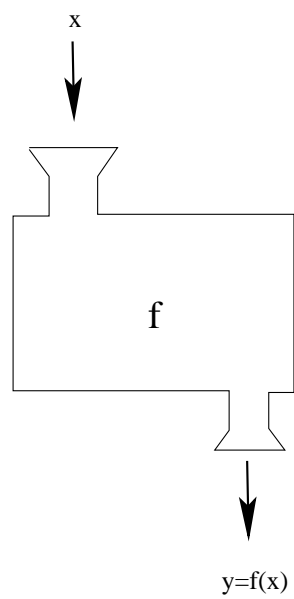
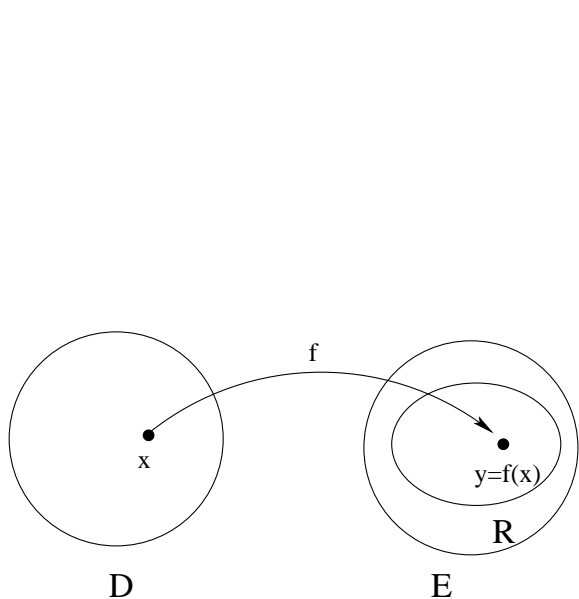


I. What is a Function?

Definition:

A **function** f from a set D to a set E is a correspondance that assigns to each element x of D exactly one element y of E .

Here, x is the **argument** of f and y is the **value** of f at x . Also, D is the **domain** of f , and the **range** is the subset R of E consisting of all values corresponding to an x in the domain D .



Example 1:

Suppose $f(x) = \frac{x+1}{x-1}$.

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

$f(-1) = \frac{-1+1}{-1-1} = \frac{0}{-2} = 0$

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

$f(\frac{1}{a}) = ?$

The domain of f is ? _____

Example 2:

Let $g(x) = \frac{\sqrt{3x-3}}{x^2-x-6}$

Find the domain of $g(x)$

II. Graphs of Functions

Definition:

The **graph** of a function is the set of points $(x, f(x))$ for x in the domain D of f .

The Vertical Line Test:

A graph of points in the plane is the graph of a function if and only if every vertical line intersects the graph *at most* once.

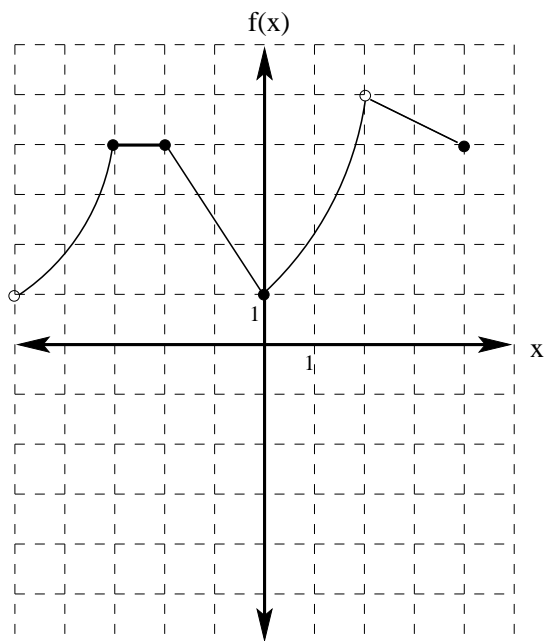
Definitions:

A function is **increasing** on an interval I if $f(x_1) < f(x_2)$ whenever $x_1 < x_2$ in I .

A function is **decreasing** on an interval I if $f(x_1) > f(x_2)$ whenever $x_1 < x_2$ in I .

A function is **constant** on an interval I if $f(x_1) = f(x_2)$ for all x_1, x_2 in I .

Example:



Find:

(a) $f(4)$

(b) x if $f(x) = 4$

(c) the domain of f

(d) the range of f

(e) the intervals where $f(x)$ is increasing