



Range

Math 1030 #13a

Domain

Functions: Building Blocks of Mathematical Modeling

Dependent
Variable

Independent
Variable

Functions

Mathematical models are based on relationships between quantities that can change.

Function - A mathematical tool that describes relationships between quantities.

Variables - The quantities related by a function

dependent variable - output variable

independent variable - input variable

A function describes how a dependent variable changes with respect to one or more independent variables.

Notation

$y = f(x)$

read "y is f of x"

f

is the name of the function

x

is the independent variable (input)

y

is the dependent variable (output)

very specifically says x is the name of the input and y is output

*points will be listed as ordered pairs
(x, y) = (input, output) = (indep. var., dep. var.)*

EX 1: Write a statement that describes a possible relationship between the variables.

a) (age, shoe size)

shoe size increases as age increases
for about $0 \leq \text{age} \leq 25$

b) (number of hours worked, size of paycheck)

\Rightarrow size of paycheck depends on # hrs worked
(if get paid by the hour)
size of paycheck increases as # of hrs worked increases

c) (APR, loan balance after 10 years)

APR = input, loan balance after 10 yrs = output
as APR increases, so does loan balance

d) (Qing's age, the difference of his age and his mother's age)

as Qing's age changes (increases), the difference of his age & his mother's age remains the same
(input changes, but output is constant)

e) (swallows of my drink, liquid left in the bottle)

as the # of swallows increases,
liquid left in the bottle decreases
(input increases, output decreases)

EX 2: Your health is a function of many variables. List a few.

output

inputs: weight, eating habits,
exercise habits, smoking
habits, age, genetics, etc.