Chapter 1 Section 1

MA1032 Data, Functions & Graphs

Sidney Butler

Michigan Technological University

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Examples of "function" in language

- "the election results are a function of the economy"
- "car sales are a function of the weather"
- "Trust is not about how much you trust one person or another to do right or wrong. How much you trust another person is a function of how much you trust yourself to be strong enough to deal with their imperfections." –Dr. Phil
- "The quality of a relationship is a function of the extent to which it is build on a solid underlying friendship and meets the needs of the two people involved." –Dr. Phil

What does "function" mean?

Statement	Meaning	Mathematics
"the election results are a function of the economy"	the winner of an election is determined by how the economy is doing	Winner = Election(economy)
"car sales are a function of the weather"	the number of cars sold on a given day is affected by the weather	Sales = Car(weather)

Definition

A function is a rule which takes certain numbers as inputs and assigns to each input exactly one output.

- "function machine"
- "is a function of"

UNIQUENESS

Example

Consider the function Winner = Election(economy).
Election(good) = Sam
Election(good) = Sara

Example

Let F be a function.

$$F(2) = 1$$

$$F(2) = 0$$

UNIQUENESS

Example

Election(good) = Sam
Election(very good) = Sam

Example

Let s be a function which squares the input.

$$s(-4) =$$

$$s(4) =$$

UNIQUENESS

Example

Let F be a function which outputs 3.

Example

Let f be a function which assigns every integer to the number 3.

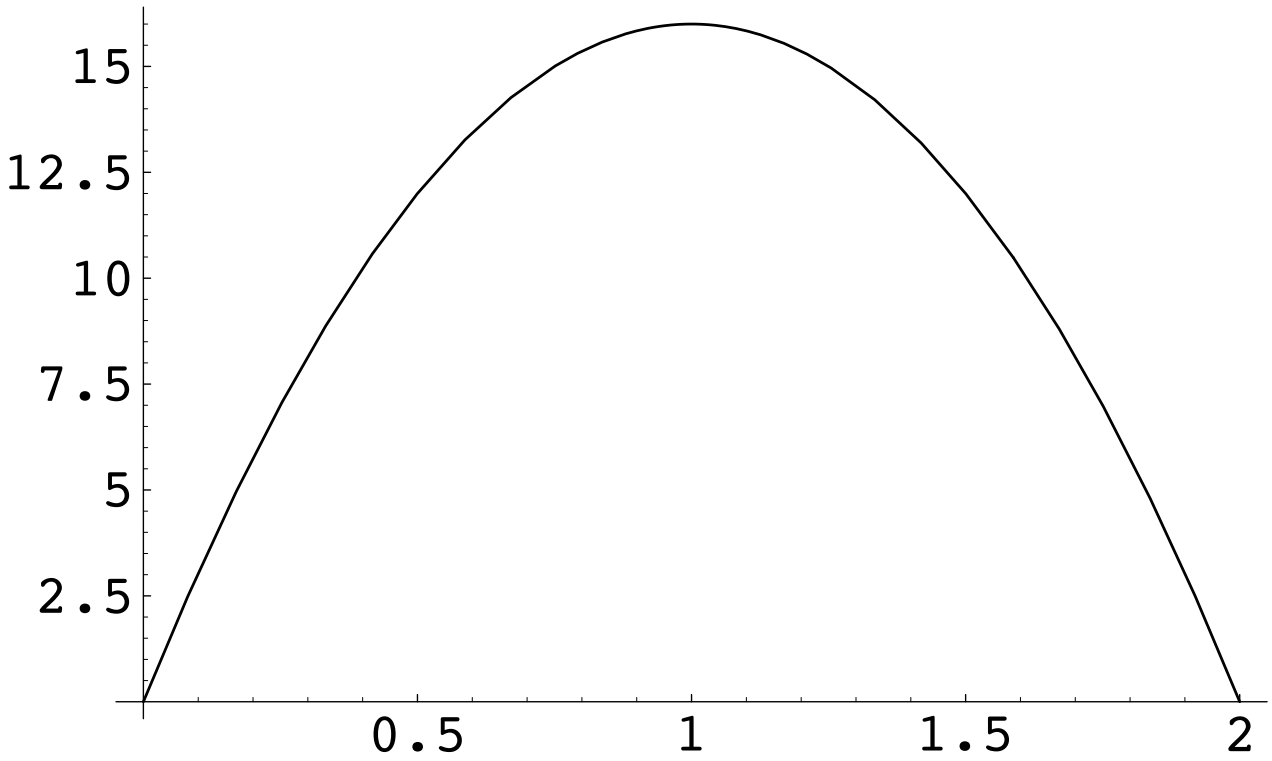
A function doesn't have to be defined by a formula.

Month	1	2	3	4	5	6
Milk	\$1.65	\$1.72	\$1.78	\$1.81	\$1.75	\$1.72
Gas	\$1.13	\$1.16	\$1.26	\$1.29	\$1.41	\$1.48

Which of these three variables are functions of one of the other variables?

Graphical Representation of a function

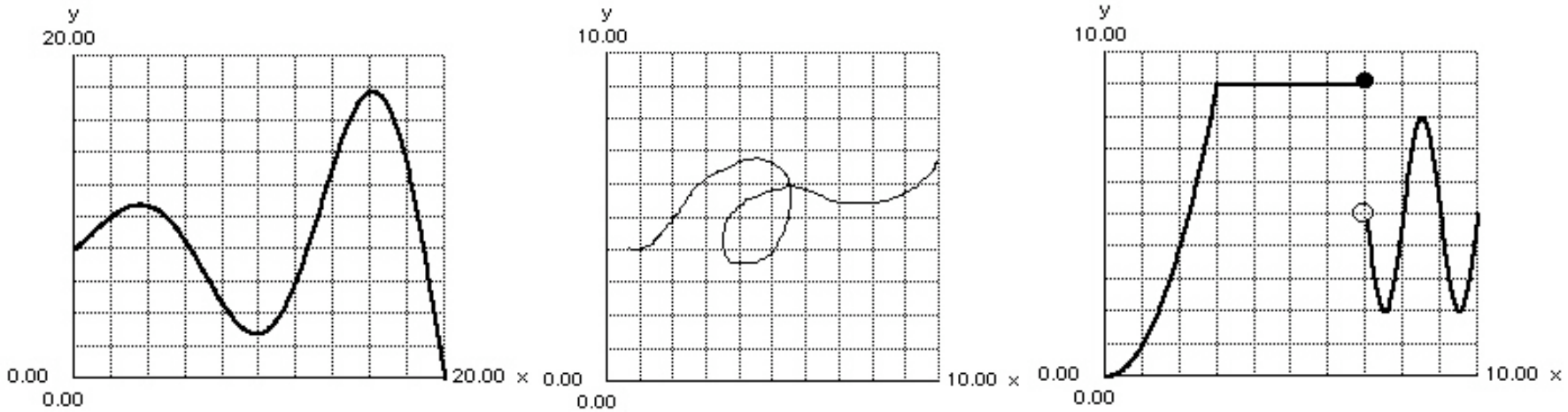
Example



Vertical Line Test.

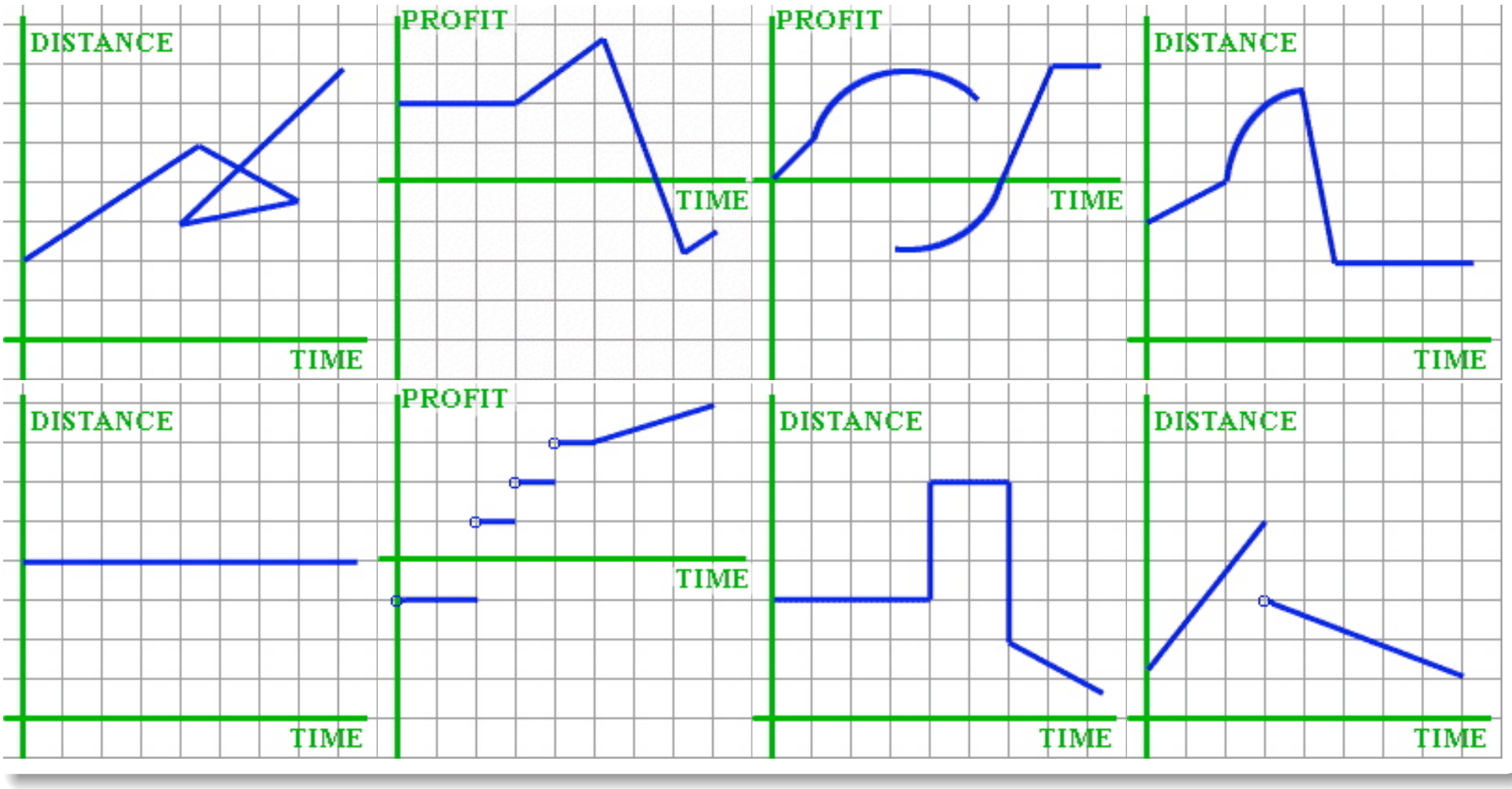
If there is a vertical line which intersects a graph in more than one point, then the graph does not represent a function.

Example



Vertical Line Test.

Example



Summary

1. Definition of a Function
2. Function Notation
3. Uniqueness
4. Representations of a Function
5. Vertical Line Test