University of Anbar

College of Agriculture

Department of Agricultural Economics

Mathematical Economics

Fourth Stage

Department of Agricultural Economics

The First lecture

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Mathematical Economics

First Lecture

What is the meaning of Mathematical Economics?

Mathematical economics is a form of economics that relies on quantitative methods to describe economic phenomena. Although the discipline of economics is heavily influenced by the bias of the researcher, mathematics allows economists to precisely define and test economic theories against real world data**.**

The difference between economic mathematics and mathematical economics?

 Economic mathematics (which should be given in the initial stages for economics students) deals with the various mathematical methods that help the student in understanding the economic behavior of economic variables without entering into the complexities and entanglements of mathematical methods, as the first stage requires a certain level of economic analysis commensurate with the level of economics subject that Given at this stage, in addition to the fact that the expansion of mathematical methods to serve the economy may take the subject out of its objectives, so mathematics remains a reliable basis to put the student on the right path in explaining the economic behavior of economic phenomena, whatever they are.

As for the mathematical economics, it is the way in which the economist builds a theoretical economic model, starting with the assumptions, then the mathematical relations, and then the mathematical treatment that leads us to the desired theoretical results. The main relationships of the model.

Mathematical Economics & Econometrics

It can be said that mathematical economics and econometrics interact, i.e. one affects the other and mutually. So, mathematical economics is econometrics, a theoretical economic model, a guide to econometric work, placed by the latter, and at least in principle, the subject of a practical test to see if the results of That model agrees or contradicts reality, and in the light of those results, the theoretical model that has been put into practical testing is accepted, modified or rejected. With all of the above, econometrics and mathematical economics are two different things, and both differ from economic mathematics

Economic Models:

The economic model reflects the economic relationships that are usually formulated in mathematical formulas to clarify the direction of these relationships, and these relationships are often referred to as structural equations. Specific time in the form of a specific abstraction or symbols or numerical values.

Economic Model Components:

The economic model, in the light of economic theory, consists of a set of elements, economic relations and structural formulas that clarify the basic structure of the model to be built.

Economic model Elements:

The economic model consists of the following elements:-

1- Variables

2- Constants

3- Parameters

Variables:

The variables included in the economic model can be classified into several types, as follows:

1- **Exogenous Variables:**
- External variables are an arbitrary instrument
- Non-inertial external variables

2- **Endogenous Variables**
- Objective variables
- Non-objective variables

3- **Lagged variables**

4- Random variables

Types of relationships in the economic models:

1- Behavioral Relationships

2- Technical Relationships

3- Micro & Macro Relationships
4- Static Relationships
5- Dynamic Relationships
6- Definitional Relationships
7- Organizational Relationships
8- Linear & Non Linear Relationships

Steps of Building Economic Model:

1- Variables Determination
2- Economic Assumptions
3- Mathematical form Determinations
4- Mathematical Solution
### 5- Graphical Presentation

Types of Functions

1- Functions of one variable

- Linear Function

- Non Linear Functions: They are functions of the second degree, third degree, or more, and they take the following forms:
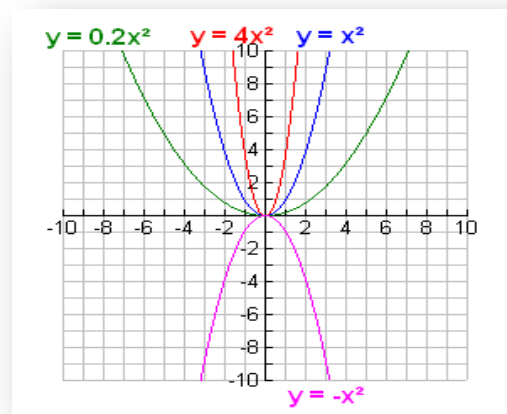
1- *Quadratic Function*

2- *Cubic Function*

3- Logarithmic Functions

4- Exponential Functions
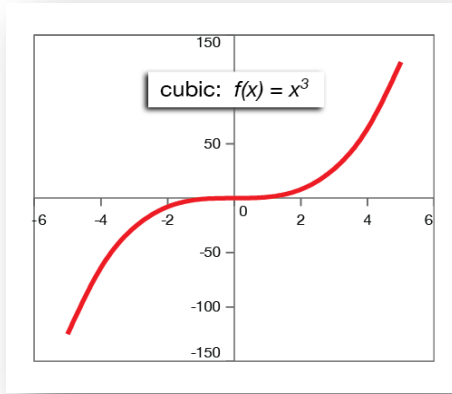
2- Functions of two or more variables

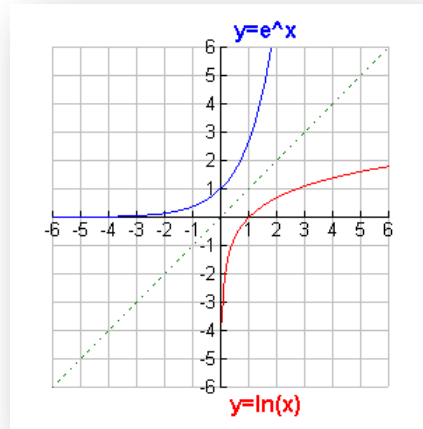# The following figures shows the different types of functions:
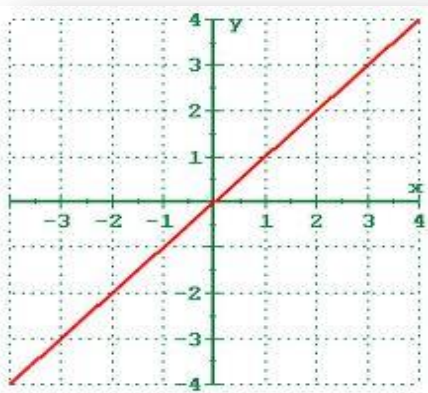
Linear Function

Quadratic Function

Cubic Function

Logarithmic and Exponential Functions

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