Business Analytics with Excel

Analytics with Excel

Learning Objectives

By the end of this lesson, you will be able to:

- Explain histograms and how to create them in Excel
- Use the Solver add-in for linear problems
- Apply Goal Seek to get the desired result
- Use Scenario Manager to compare and create different scenarios
- Utilize Data Table to analyze results for different input values

A Day in the Life of Business Analyst

Your organization’s logistic data is stored in different Excel sheets and contains information on different modes, routes, and costs involved.

Using this, the organization wants you to check the costs involved and optimize the costs for logistics.

This lesson will help you understand how to use data statistics and study the different ways to optimize linear problems using Toolpak and Scenario manager.

DATA AND
ARTIFICIAL INTELLIGENCE

What-If Analysis

What-If Analysis

The What-if analysis feature allows you to manipulate data with ease.

What-If Analysis: Tools

Excel offers various What-If Analysis tools.

Goal Seek

Data Table

Scenario Manager

Solver

What-If Analysis: Scenario

If one needs to take out a loan, they can calculate the terms of the loan using What-If Analysis tools.

What-If Analysis: Tools

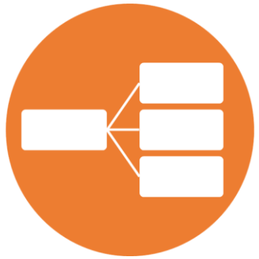
Goal Seek

It evaluates the payment formula and calculates the amount to be paid. It can also use the amount to be paid to calculate the payment formula.

Data Table

It does a comparative analysis of the available data. It also shows the results in the table without changing the original formula's references.

What-If Analysis: Tools



Scenario Manager

It substitutes input values for multiple cells. It can also be used to view the results of different input values at the same time.

Solver

It can be used to find an optimal solution for a formula in one cell by adjusting the values in other cells according to the specifications.

Assisted Practice: Install Analysis ToolPak

Problem statement:

Demonstrate how to Install Analysis ToolPak in Excel.

ASSISTED PRACTICE

Assisted Practice Guidelines

Steps to follow:

Step 1: Open the Excel file

Step 2: Install ToolPak

ASSISTED PRACTICE

Assisted Practice: Install Analysis ToolPak

Problem statement:

Demonstrate how to solve a problem using the What-If Analysis tool, Goal Seek

ASSISTED PRACTICE

Assisted Practice Guidelines

Steps to follow:

Step 1: Open the Excel file

Step 2: Use Goal Seek

ASSISTED PRACTICE

Assisted Practice: Install Analysis ToolPak

Problem statement:

Demonstrate how to compare scenarios using the What-If Analysis tool, Scenario Manager

ASSISTED PRACTICE

Assisted Practice Guidelines

Steps to follow:

Step 1: Open the Excel file

Step 2: Use Scenario Manager

ASSISTED PRACTICE

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Line Graph, Bar Graph, and Pie Chart

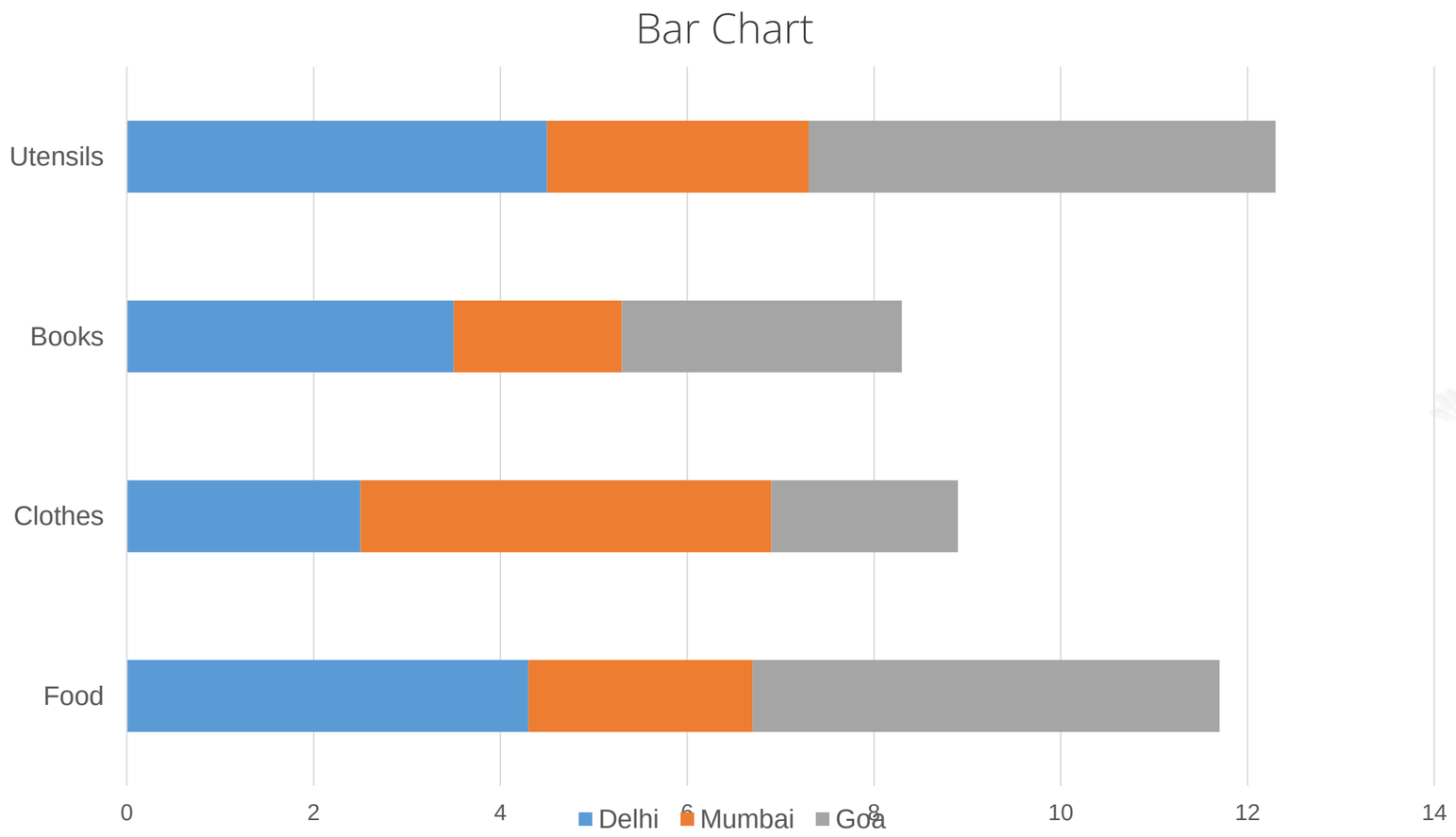
Line Graph

Line graphs are used to visualize data patterns over a period.

Source: fool.com

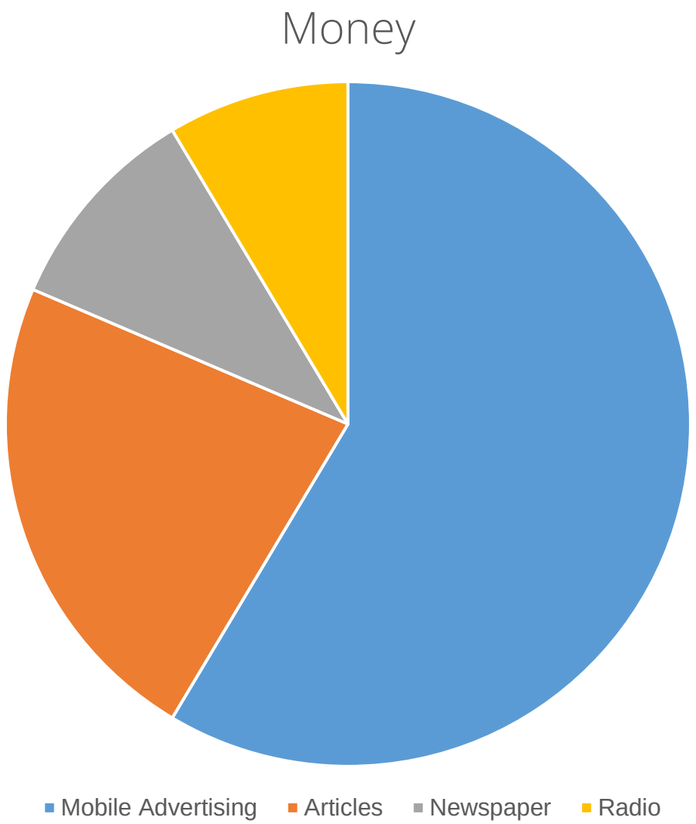
Bar Graph

Bar graphs are used to represent the numeric distribution of categorical data.



Pie Chart

Pie charts are used to show the distribution of values of the total values.



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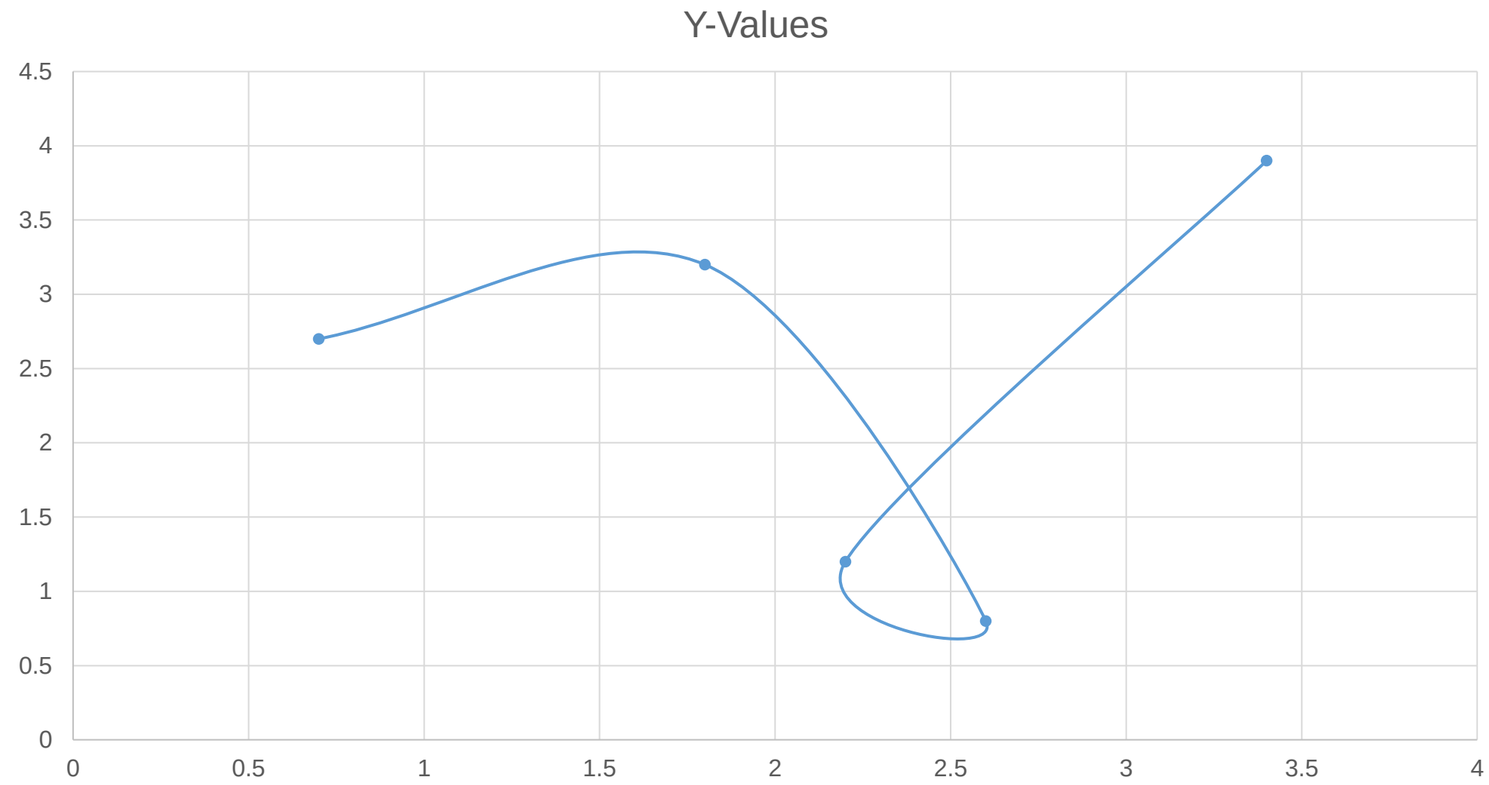
Scatter Plot

Scatter Plot

Scatter plots are used to show two numerical values in a single graph. The x- and y-axes are a set of numerical values.



The intersections signify each occurrence of data and are represented by dots.

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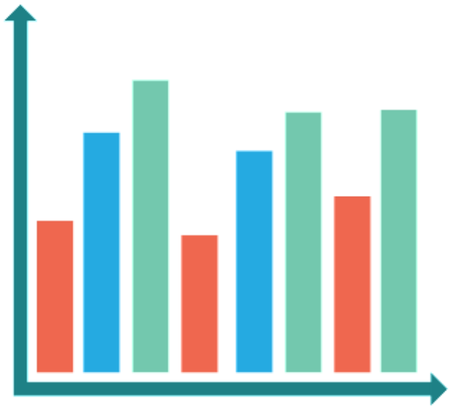
Histogram

Histogram

The Normality of data, which is needed for most statistical calculations, can be checked using a histogram.



A histogram is a graphical representation of the distribution of a single variable.

Histogram: Scenario

This dataset includes information on each employee's resolved calls and the duration of each call.

Call ID	Date	Name	Call Duration (Minutes)	Resolved Status
15752396	05/03/2015	Sean	177	Yes
12917869	26/08/2015	Sean	140	Yes
18179290	04/12/2015	Sean	40	Yes
14530174	04/12/2015	Harry	40	Yes
16386917	15/12/2015	Harry	29	Yes
15026748	07/10/2015	John	98	Yes
16945125	18/12/2015	John	26	Yes
15594296	10/12/2015	John	34	Yes
14181488	05/10/2015	John	100	Yes
15371742	15/12/2015	John	29	Yes
15096954	05/11/2015	Sean	69	Yes
15431945	11/11/2015	Harry	63	Yes
18030549	24/12/2015	Harry	20	Yes

Histogram: Class Intervals

A class interval refers to the size of each class into which a range of variables is divided.

Bin
0 - 3
4 - 7
8 - 11
12 - 15
> 15

Call ID	Date	Name	Call Duration (Minutes)	Resolved Status
15752396	05/03/2015	Sean	177	Yes
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18030549	24/12/2015	Harry	20	Yes

Histogram: Class Intervals

To check the number of calls answered in each time interval, the minutes bin will be the class interval.

Bin
0 - 3
4 - 7
8 - 11
12 - 15
> 15

Call ID	Date	Name	Call Duration (Minutes)	Resolved Status
15752396	05/03/2015	Sean	177	Yes
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15431945	11/11/2015	Harry	63	Yes
18030549	24/12/2015	Harry	20	Yes

Assisted Practice: Create Histogram

Problem statement:

Demonstrate how to create a Histogram in Excel.

ASSISTED PRACTICE

Assisted Practice Guidelines

Steps to follow:

Step 1: Open the Excel file

Step 2: Create histogram

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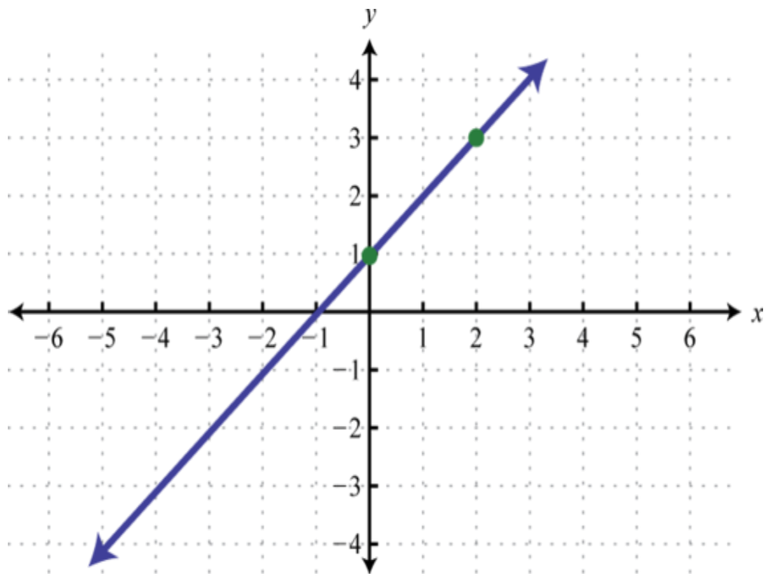
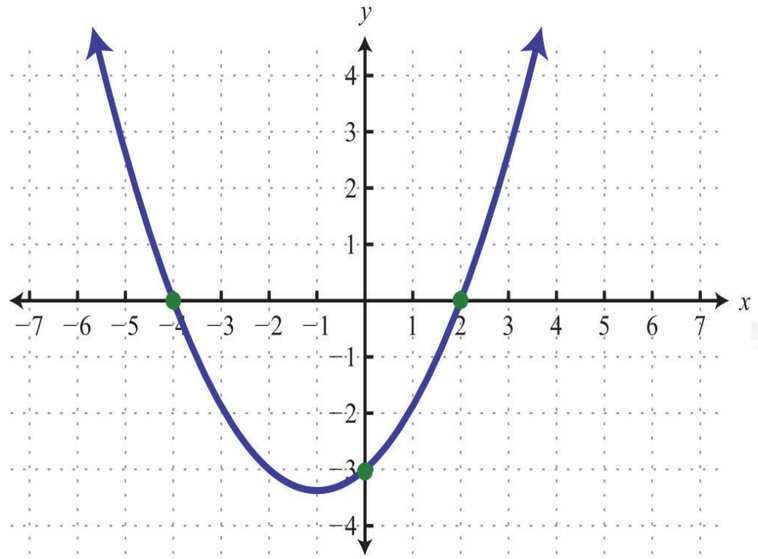
Solver Add-in

Solver Add-in: Introduction

In Excel, Solver Add-in is used to solve complex linear and non-linear problems.



Linear



Non-Linear

Assisted Practice: Solve linear problem using Solver Add-in

Problem statement:

Demonstrate ow to solve linear problems using Solver Add-in.

ASSISTED PRACTICE

Assisted Practice Guidelines

Steps to follow:

Step 1: Open the Excel file

Step 2: Optimization problem

ASSISTED PRACTICE

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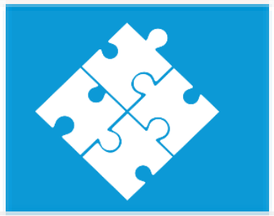
Data Tables

Data Tables: Introduction



Data tables take sets of input values and determine possible results.

By creating a data table, one can try out different values for formulas instead of creating two different scenarios.

Assisted Practice: Create Data Tables

Problem statement:

Demonstrate how to create data tables

ASSISTED PRACTICE

Assisted Practice Guidelines

Steps to follow:

Step 1: Open the Excel file

Step 2: Creating data table with Excel

ASSISTED PRACTICE

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Descriptive Statistics

Descriptive Statistics: Introduction

Descriptive statistics is a data analysis tool that produces a summary of the key statistics for a dataset.

It provides statistical information such as sample variance, mean, and standard deviation for the data in a few clicks.

Assisted Practice: Create Descriptive Statistics

Problem statement:

Demonstrate how to create descriptive statistics for a given dataset

ASSISTED PRACTICE

Assisted Practice Guidelines

Steps to follow:

Step 1: Open the Excel file

Step 2: Create descriptive statistics

ASSISTED PRACTICE

Key Takeaways

- A histogram is a graphical representation of the distribution of a single variable.
- The solver finds an optimal solution for a formula.
- Goal seek can be used to start with the desired result and calculate the input value that gives a result.
- The Scenario Manager helps view the results of different input values at the same time.
- Data tables can be used to perform a comparative analysis of the available data.

Knowledge Check

Knowledge Check

1

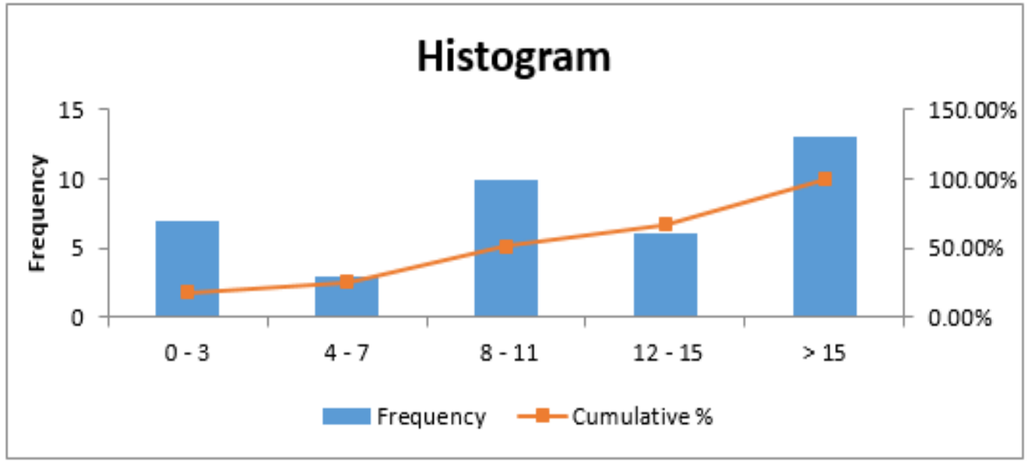
In the given histogram, which class interval has the highest frequency?

a. 0 – 3

b. 4 – 7

c. 8 – 11

d. >15



Knowledge Check

1

In the given histogram, which class interval has the highest frequency?

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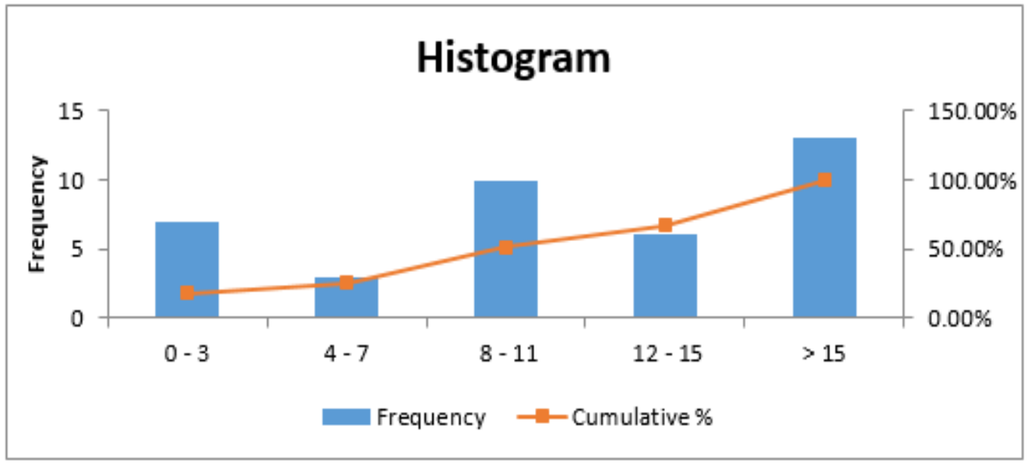


The correct answer is **d**

The class interval "> 15" has the highest frequency.

Knowledge Check

2

Match the descriptions on the left with functions in the right column for the given Excel Features.

a. Goal Seek	a. Provides statistical information
b. Data Tables	b. Works backward from a desired result
c. Solver Add-in	c. Performs comparative analysis of data
d. Descriptive Statistics	d. Finds an optimal solution for a formula

Knowledge Check 2

Match the descriptions on the left with functions in the right column for the given Excel Features.

a. Goal Seek	a. Provides statistical information
b. Data Tables	b. Works backward from a desired result
c. Solver Add-in	c. Performs comparative analysis of data
d. Descriptive Statistics	d. Finds an optimal solution for a formula

The correct answer is **a-b, b-c, c-d, d-a**

Goal Seek works backward from the desired result. Data Tables perform a comparative analysis of the data. Solver Add-in finds an optimal solution for a formula. Descriptive Statistics provides statistical information.

Knowledge Check

3

While solving problems using Solver Add-in, constraints play a critical role.

a. True

b. False

Knowledge Check

3

While solving problems using Solver Add-in, constraints play a critical role.

a. True

b. False

The correct answer is **a**

While solving problems using Solver Add-in, constraints play a critical role. Constraints are defined limitations on resources that allow Solver to find a feasible solution.

Knowledge Check

4

Which of the following is NOT a What-If Analysis Tool in Excel?

a. Goal Seek

b. Scenario Manager

c. Macros

d. Data Tables

Knowledge Check

4

Which of the following is NOT a What-If Analysis Tool in Excel?

a. Goal Seek

b. Scenario Manager

c. Macros

d. Data Tables

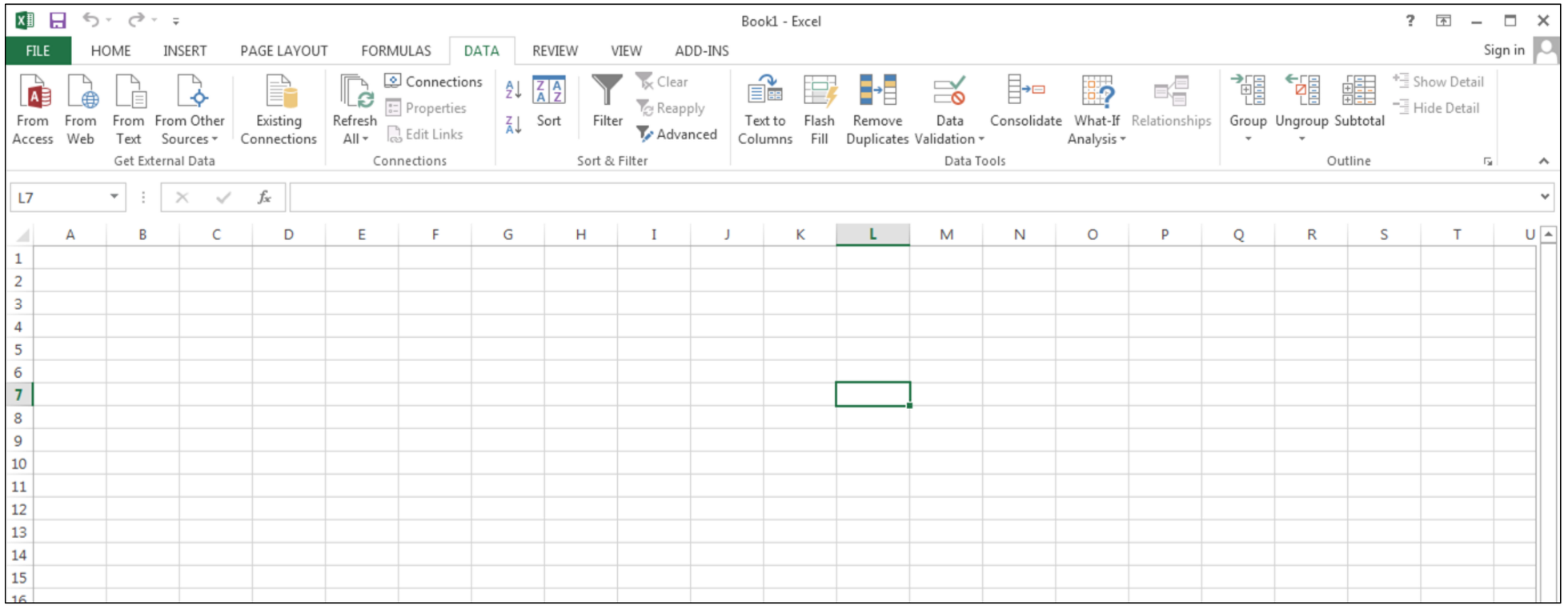
The correct answer is **c**

Macros are not a What-If Analysis Tool in Excel.

Knowledge Check

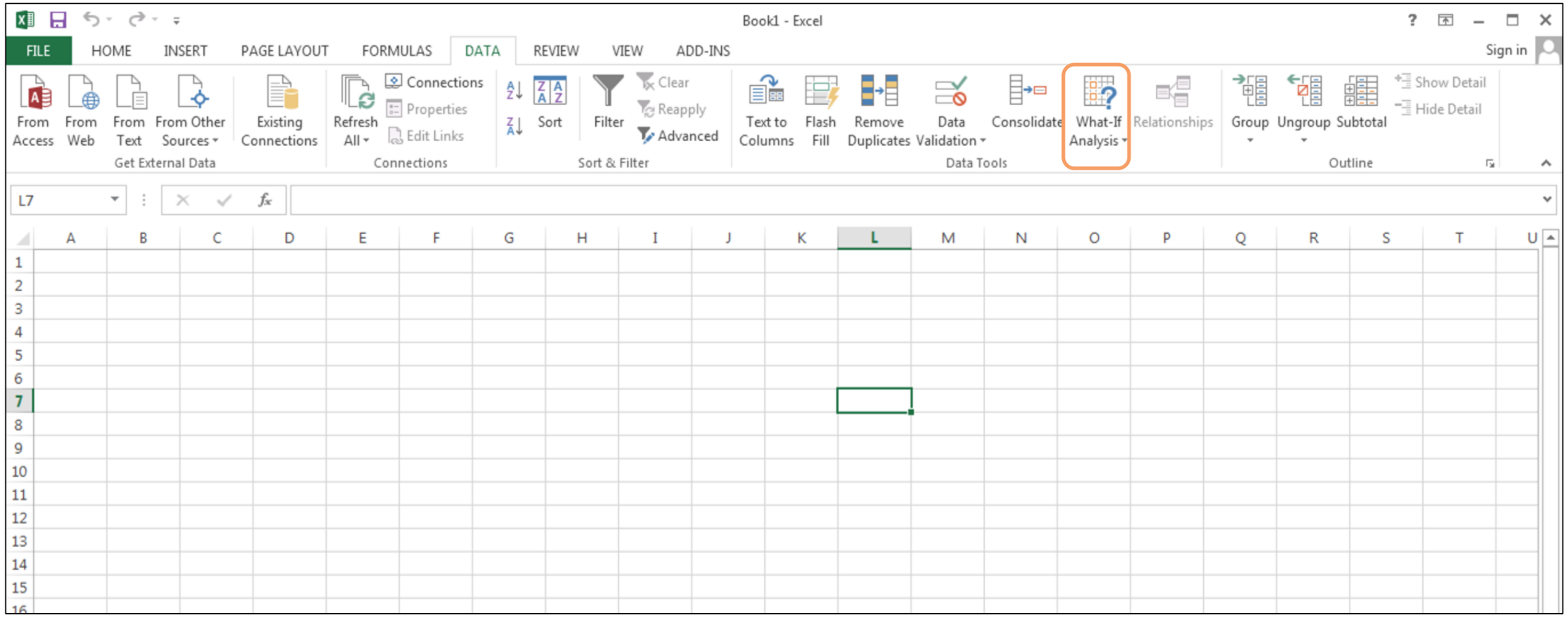
5

Under the Data tab, where will be the command Scenario Manager?



Knowledge Check 5

Under the Data tab, where will be the command Scenario Manager?



The correct answer is **Under What-if Analysis Tab**

The command Scenario Manager will be found under the what-if Analysis Tab.

Knowledge Check

6

Which of the following is NOT required while solving a Goal Seek problem?

a. A set cell that contains a formula

b. The scenario name

c. The value to be reached

d. A changing cell that contains an initial value

Knowledge Check

6

Which of the following is NOT required while solving a Goal Seek problem?

a. A set cell that contains a formula

b. The scenario name

c. The value to be reached

d. A changing cell that contains an initial value

The correct answer is **b**

The scenario name is not required while solving a Goal Seek problem.