

Characteristics of the Range

خوش آید، آسان

- Easy to Compute.
- Uses Only Two Values (high and low).
- Sensitive to Extremes.

X 91 ✓

العينة تختلف اختلاف بسيط
عن السكان

Sample Mean (Statistic)

قانون الجدل

أف

مختلفة

$$\bar{x} = \frac{\sum_{i=1}^n x_i}{n}$$

$\bar{x}$ - Sample mean (x-Bar)
 n - Sample size

طوة

حجم العينة

نصف القانون

التي قبله يسه رتبه

نرمز لحوسبه

الصيغة

- The average for all values in the sample computed by dividing the sum of all sample values by the sample size.

The Correlation Coefficient

اختياري

- The Correlation Coefficient measures the strength of the linear relationship between two variables.

$$-1.0 \leq r \leq +1.0$$

قاعدة

- r close to 1.0 implies a strong positive linear relationship.
- r close to -1.0 implies a strong negative linear relationship.
- r close to 0.0 implies a weak linear relationship.

لا يوجد علاقة - أو علاقة خطية ضعيفة

Business Statistics

The Correlation Coefficient

عامل الارتباط

The Correlation Coefficient measures the strength of the linear relationship between two

Types of Events - Example

اختياري

- Dependent Events

- Two events are dependent if the occurrence of one event impacts the probability of the other event occurring.

A Company has 10 employees – 3 male and 7 female. Two employees are selected at random to attend a conference.

Event A – First person selected is female.

Event B – Second person selected is male.

Events A and B are dependent because the chance of a male selected second depends on whether a male or female is selected first.

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3.3 Median

اختياري

Concept

The median is a center value that divides a data array into two halves (Md).

• Data Array

- Data that have been arranged in numerical order.

Median Index

$$i = \frac{1}{2}(n)$$

قانون مؤشر الوسيط

- i = The index of the point in the data set corresponding to the median value.
- n = Sample size.

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3.3 Median

المتوسط
لكننا فقط المتوسط قبل كان المتوسط الحسابي

Pencil Pro

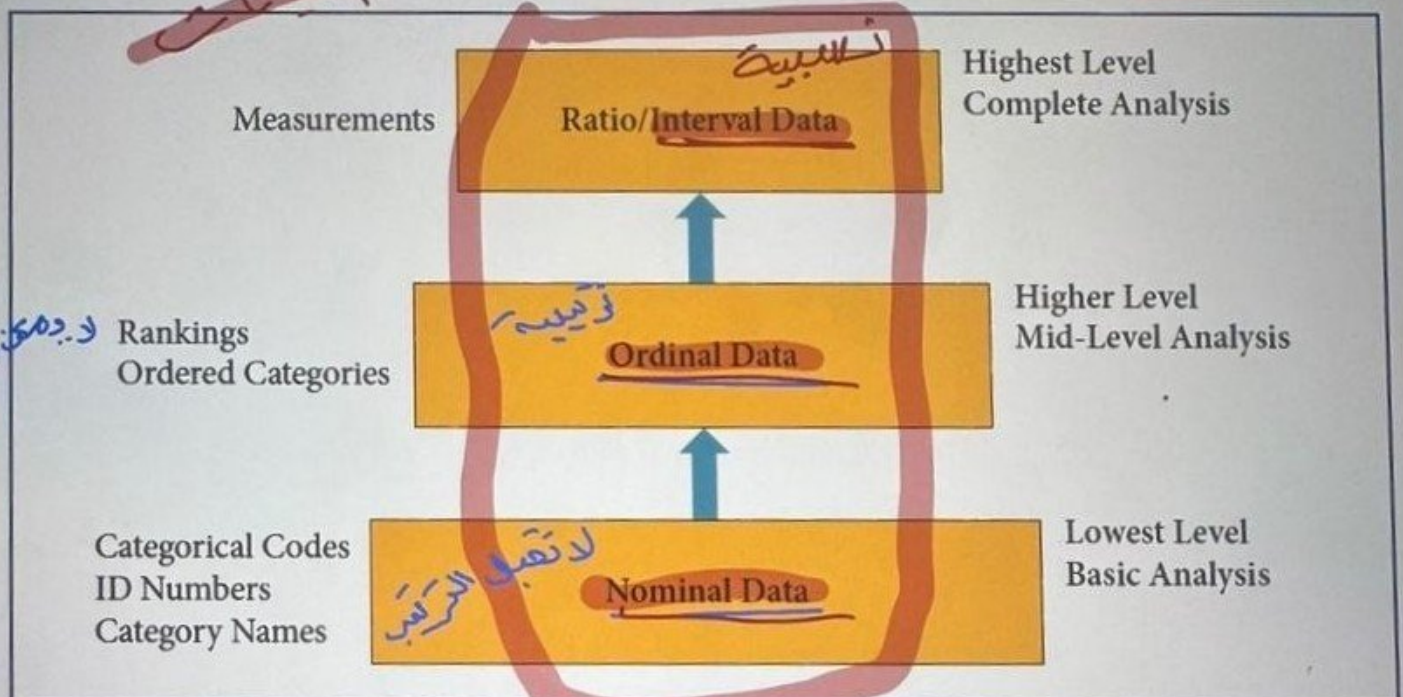
Pie Charts

- A graph in the shape of a circle.
- Use to show visually the parts of a total.
- The circle is divided into “slices” corresponding to the categories or classes to be displayed.
- The size of each slice is proportional to the magnitude of the displayed variable associated with each category or class.

Data Measurement Levels

مستويات قياس البيانات

اصطلاح



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Data Measurement Levels

مستويات قياس البيانات

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Slide - 14

الشريحة - 14

سنتر الحزب

الخاصية

للمتوسط

Central Property of the Mean

Sales Example

أكتبنا كل x نفق من 30
قيم الأكبر

5	-25
10	-20
15	-15
20	-10
20	-10
20	-10
30	0
40	+10
50	+20
90	+60

هي القيمة

$$\sum = 0.0$$

و نجمع
النتيجة
صفر كذا
صحيح إلى

النتيجة هي 30

$$\bar{x} = \frac{\sum_{i=1}^n x_i}{n} = \frac{300}{10} = 30$$

نحسب $\bar{x}$ كيف نحسبه مجموع $n \div x_i$

هذه القيمة التي نتوصلها من $\bar{x}$

Property: The sum of the deviations from the mean will always equal 0.0.

لحساب انحرافات المتوسط
للمتوسط $(x - \bar{x})$

مجموع انحرافات المتوسط = 0

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Central Property of the Mean

الخاصية المركزية للمتوسط

الانحراف المعياري

الانحراف المعياري

4.4 Standard Deviation

- Population Standard Deviation
- 1. The most commonly used measure of variation.
- 2. A measure of distance from the mean.
- 3. The positive square root of the variance.

القانون

$$\sigma = \sqrt{\sigma^2} = \sqrt{\frac{\sum_{i=1}^N (x_i - \mu)^2}{N}}$$

فقط بدون تربيع

- Has the same units as the original data.

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4.4 Standard Deviation

4.4 الانحراف المعياري

Pencil Pro

Multiplication Rule for Independent Events - Example

A small mid-western city has three major airlines that serve the airport. Suppose that 60% of the passengers fly United Airlines, 30% fly Delta, and 10% fly Southwest. Further, suppose that 70% of the fliers are flying for pleasure and 30% fly for business. Assuming type of trip and the airline used are independent, what is the probability that a flier uses United and is a business traveler?

لا بد من كتابة الصيغة + من الاحتمال يكون بين الصور الواحد

$$P(\text{United and Business}) = P(\text{United}) \cdot P(\text{Business}) = (0.60)(0.30) = 0.18$$

الخطوة الأولى: الجواب: 0.18

كل يكون نفس لفظة هذي
ولكن المثال هو هذا بالإحصاء

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Multiplication Rule for Independent Events - Example

قاعدة الضرب للأحداث المستقلة - مثال

A small mid-western city has three major airlines that serve the airport.

4.2 Range

مثال

- A measure of variation that is computed by finding the difference between the maximum and minimum values in a data set

معنا قافله الجوی

$$R = \text{Maximum Value} - \text{Minimum Value}$$

- Simplest measure of variation.
- Is very sensitive to extreme values.
- Ignores the data distribution.

توزیع البيانات یقیناً

Grouped Data Frequency Distributions

- Continuous data

المتصلة

- Data whose possible values are uncountable and that may assume any value in an interval (weight, length, time).

من أمثلة البيانات المستمرة

- Discrete data with many possible outcomes (income, stock prices, GPA's).
- Summarized in a grouped data frequency distribution.
- Data are organized in classes.

Dependent and Independent Variables

متغير تابع y
متغير تابع

- Dependent Variable

– A variable whose values are thought to be a function of, or dependent on, the values of other variables. This dependent variable is referred to as the y variable and is placed on the vertical axis of a scatterplot.

متغير مستقل x

- The Independent Variable

– A variable whose values are thought to influence the values of the dependent variable. Independent variables are also called explanatory variables. The dependent variable is referred to as the x variable and is placed on the horizontal axis of a scatterplot.

5.1 Scatter Plots and Correlation

- Scatter Plot

- A two-dimensional plot showing the values for the joint occurrence of two quantitative variables. The scatter plot may be used to graphically represent the relationship between two variables. It is also known as a scatter diagram.

- Correlation Coefficient

معامل الارتباط

- A quantitative measure of the strength of the linear relationship between two variables. The correlation ranges from -1.0 to $+1.0$. A correlation of ± 1.0 indicates a perfect linear relationship, whereas a correlation of 0 indicates no linear relationship.

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Median - Impact of Extreme Values

Sales Data Example

5 10 15 20 20 20 30 40 50 90

$$\text{Median} = (20+20)/2 = 20$$

5 10 15 20 20 20 30 40 50 390

$$\text{Median} = (20+20)/2 = 20$$

The Median is Unaffected by Extreme Values.

Business Statistics

Median - Impact of Extreme Values Sales Data Example

١ - تأثير بيانات مبيعات القيم القصوى

Data Types

جاء على سؤال اختياري

وسؤالين أو

وسؤال اصطلاح

تجيبك مثال وانني تختاري
البيانات الكمية
والنوعية

Quantitative

Measurements whose values are inherently numerical.

Discrete (e.g. number of children).

Continuous (e.g. weight, volume).

Qualitative

Data whose measurement scale is inherently categorical (e.g. marital status, political affiliation, eye color).

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Data Types

Quantitative

أنواع البيانات

الكمية

Measurements whose values are inherently numerical.

Discrete (e.g.

بظريعتها

عبارة عن أرقام
يعني نستخدم عددا

دعني

القياسات التي تكون قيمها عددية بطبيعتها.

لجبي دة صلااح

When Extreme Values are Present Impact on the Mean - Sales Example

هنا احتمالنا الاول

20	5	10	40	50
15	30	20	20	90

لما يكون التغير في قيمة واحدة يساوي (قيمة متطرفة)

Original Data

$$\bar{x} = \frac{\sum x}{n} = 30$$

New Data (one value changed)

20	5	10	40	50
15	30	20	20	390

$$\bar{x} = \frac{\sum x}{n} = 60$$

هنا غيرنا القيمة واحدة فقط

الاستنتاج
Conclusion: The Mean is Sensitive to Extreme Value

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القيم المتطرفة

When Extreme Values are Present Impact on the Mean - Sales Example

Simple Linear Regression Analysis

2 types

- When there are only two variables - a dependent variable, and an independent variable, the technique is referred to as simple regression analysis.
- When the relationship between the dependent variable and the independent variable is linear, the technique is simple linear regression.

اختیاری

Descriptive Measures of the Center

• Mean

آرٹھماتک
The arithmetic ^k average of the data.
میان

• Median

الوسطی
The midpoint of the data.
نقطہ وسط

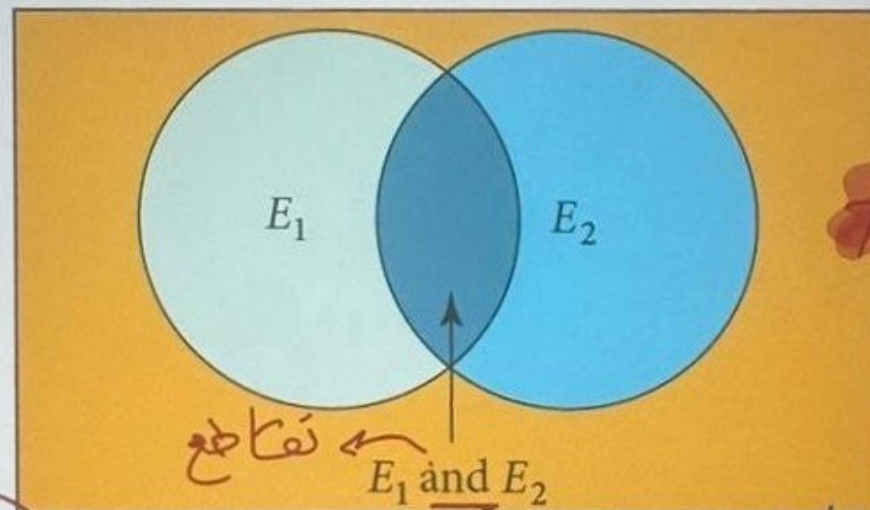
• Mode

صغول
The data value ^{A_k} occurring most frequently.
تکرار
تعداد نفع

لکھنے الشریحہ
لکھ لکھو

اعلیٰ تکرار سوال اختیاری

Rule 5: Addition Rule for Any Two Events – Keyword “or” Means Addition



هنا تمثل لنا
الاتحاد
ماذا يساوي

$$P(E_1 \text{ or } E_2) = P(E_1) + P(E_2) - P(E_1 \text{ and } E_2)$$

read ACD

العدد المشترك بينهما

نعمل لنا التقاطع

Business Statistics

1.3 Populations and Samples

• Population

- The set of all objects or individuals of interest or the measurements obtained from all objects or individuals of interest.

• Sample

- A subset of the population.

• Census

- An enumeration of the entire set of measurements taken from the whole population.

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1.3 Populations and Samples

• Population

- The set of all objects or individuals of interest or the measurements obtained from all objects or individuals of interest.

مجموعة جميع الأشياء أو الأفراد محل الاهتمام أو القياسات التي تم الحصول عليها من جميع الأشياء أو الأفراد محل الاهتمام.

Characteristics of the Mode

- The value in a data set that occurs most frequently.
- Is not affected by extreme values.
- Can be used for both quantitative and qualitative data (ratio, interval, ordinal, nominal).
- Can have more than one mode, or no mode.
- Distribution with two modes – bimodal.

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Characteristics of the Mode

المحصول mode
خصائص الوضع

- The value in a data set that occurs most frequently.

تفري - اصطلاح

6.1 The Basics of Probability

تعريف

- **Probability**
 - The chance that a particular event will occur.
 - The probability value will be in the range 0 to 1.
- **Experiment**
 - A process that produces a single outcome whose result cannot be predicted with certainty.
- **Sample Space**
 - The collection of all outcomes that can result from a selection, decision, or experiment.

نموذج

The Regression Model

اختياري

معادلة

Population Model:

$$y = \beta_0 + \beta_1 x + \varepsilon$$

y - Value of the dependent variable

x - Value of the independent variable

β_0 - Population's y intercept

β_1 - Slope of the population regression line

ε - Random error term → الخط العشوائي

نقطة التقاطع

ميل الخط أو انحدار
المجموع

3.4 Mode المعنى

دأب صلا ح

Mode: The value in the data which appears most frequently

Sales Data

<u>20</u>	5	10	40	50
15	30	<u>20</u>	<u>20</u>	90

نرى بيها من
الاهل الى عدد كبير

x	Freq(x)
5	1
10	1
15	1
20	3
30	1
40	1
50	1
90	1

Mode → 20

القيمة التي تكرر
أكثر

Mode = 20 (occurs 3 times)

أكبر قيمة في الأرقام

أكثر تكرر بالقيمة المتكررة

Business Statistics

3.4 Mode Mode: The value in the data which appears most frequently

mode

Sales Data

3 وضع الوضع القيمة الموجودة في البيانات التي تظهر بشكل متكرر

Rule 10: Multiplication Rule for Independent Events

يجب أن يكون السؤال على كذا صيغة

- The joint probability of two independent events is simply the product of the probabilities of the two events.

15 درجات

Probability Rule 9

على هذا السؤال

For independent events E_1, E_2

$$P(E_1 \text{ and } E_2) = P(E_1) \times P(E_2)$$

هذا السؤال
على درجته

Business Statistics

Rule 10: Multiplication Rule for Independent Events

القاعدة 10: قاعدة الضرب للأحداث المستقلة

- The joint probability of two independent

الاحتمال المشترك لاثنتين مستقلتين

events is simply the product of the

الأحداث هي ببساطة نتاج

احتمالات

Possible Values and Summation Rules

قاعدة

Probability Rule 1

Probability of event occurring is always between 0 and 1.

For any event E_i
 $0 \leq P(E_i) \leq 1$ for all i

احتمال وقوع
حدث معين

0 = no chance of occurring
1 = 100% chance of occurring

Probability Rule 2

Sum of the probabilities of all possible outcomes is 1.

مجموع الاحتمالات لجميع النتائج

$$\sum_{i=1}^k P(e_i) = 1$$

مجموع
الاحتمالات يساوي 1

k - Number of outcomes in the sample

e_i - i^{th} outcome

Uses for Regression Analysis

وصف
→
• Description

– When we are primarily interested in analyzing the relationship between the x and y variables as measured by the regression slope coefficient.

تنبؤ
• Prediction

– When we are primarily interested in predicting what the value of the y variable will be when we know a value of the x variable.

تنبؤ's