Data Analysis
数据分析

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To Begin With

QR Mathematical Convention 5

When graphical data presentations, such as bar graphs and line graphs, are shown with scales, you should read, estimate, or compare quantities by sight or by measurement, according to the corresponding scales.

QR Mathematical Convention 4

Scales, grid lines, dots, bars, shadings, solid and dashed lines, legends, etc., are used on graphs to indicate the data. Sometimes scales that do not begin at 0 are used, and sometimes broken scales are used..

看图要点

- Carefully understand title, the labels for x-axis and y-axis, and legends. 看标题，XY 轴，图例找到数据的含义
- Carefully examine the scales and unit. 看单位
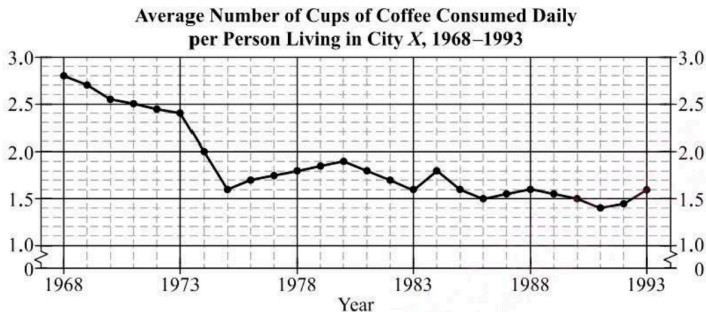- Carefully examine the the starting point. 看起点

图: The graph shows The trends of The average number of cups of coffee consumed daily per person living in city X by year. Y suggest number of cups. X suggest the year. Y use a broken scales.

Counting Methods

Presentation Overview for Counting Methods

1 Counting Methods
   Lists
   Multiplication Principle
   Permutations
   Permutations of N Objects Taken K at a Time
   Combinations

2 Probability

3 Descriptive Data Analysis (Exploratory Data Analysis)

4 Random Variables and Probability Distribution

Lists

定义

- In a list, the members are ordered—that is, rearranging the members of a list makes it a different list.
- Elements can be repeated in a list and the repetitions matter.

例

1, 2, 3 and 2, 3, 1 and 1, 1, 2, 3 are all different list.

Multiplication Principle

Multiplication Principle
乘法原则

定义

- Suppose there are two choices to be made sequentially and that the second choice is independent of the first choice.
- Suppose also that there are k different possibilities for the first choice and m different possibilities for the second choice.

Then, under those conditions, there are km different possibilities for the pair of choices.

例

For a 6 digit Bank PIN, there could be 10^6 different passwords.

Every digit can not repeat over 3 times. When you chose 1, 1, 1 for first 3 digits, the rest of the digits can not be one. The latter 3 choices is not independent on the first 3 choices. On the contrary, The latter 3 choices is dependent on the first 3 choices.

Can you draw the decision tree?

Permutations

Permutation
全排

Permutations of N Objects Taken K at a Time

Combinations

Probability

Presentation Overview for Probability

❶ Counting Methods

❷ Probability
   Sets
   Events
   Mutually Inclusive Events
   Independent Events

❸ Descriptive Data Analysis (Exploratory Data Analysis)

❹ Random Variables and Probability Distribution

Sets

Events

Mutually Inclusive Events

Independent Events

Descriptive Data Analysis (Exploratory Data Analysis)

Presentation Overview for Descriptive Data Analysis (Exploratory Data Analysis)

1 Counting Methods

2 Probability

3 Descriptive Data Analysis (Exploratory Data Analysis)
Data Type
Methods for Presenting Data
Measures of Central Tendency
Measures of Position
Measures of Dispersion

4 Random Variables and Probability Distribution

Data Type

Methods for Presenting Data

Measures of Central Tendency

Measures of Position

Measures of Dispersion

Random Variables and Probability Distribution

Presentation Overview for Random Variables and Probability Distribution

❶ Counting Methods

❷ Probability

❸ Descriptive Data Analysis (Exploratory Data Analysis)

❹ Random Variables and Probability Distribution
    Random Variables
    Probability Distribution
    Normal Distribution

Random Variables

Probability Distribution

Normal Distribution

1 Min Break

Questions? Comments?