



# **INFERENCE STATISTICS**

## **INTRODUCTION**

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# TOPIC OUTLINE

Inferential Statistics

Distribution

Histogram

Normal Distribution



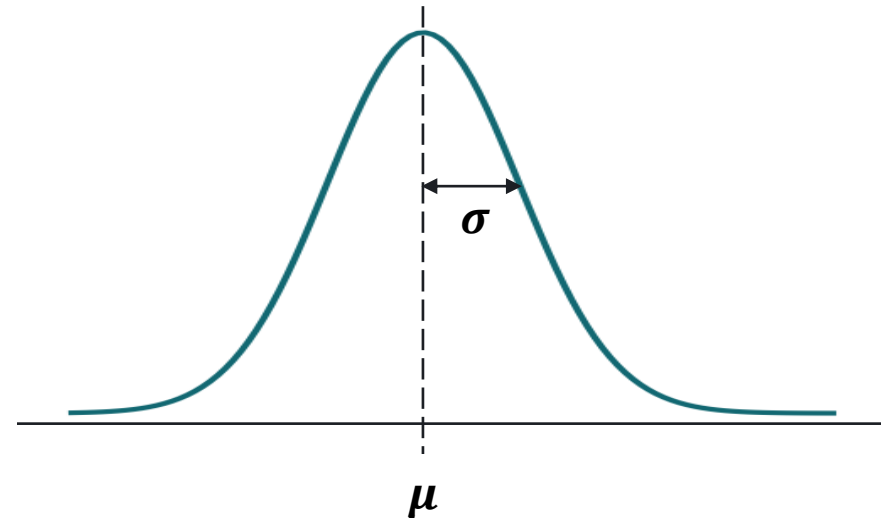
# DISTRIBUTION



# INFERENCEAL STATISTICS

Inferential statistics is a branch of statistics that analyzes and interprets data to make conclusions beyond the observed dataset. It focuses on drawing meaningful inferences about a population based on a sample using techniques such as hypothesis testing, confidence intervals, and regression analysis.

Normal Distribution:



# DISTRIBUTION

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Distribution or the probability distribution describes the probabilities or frequencies of different outcomes in an experiment or observed data.

Rolling one die:



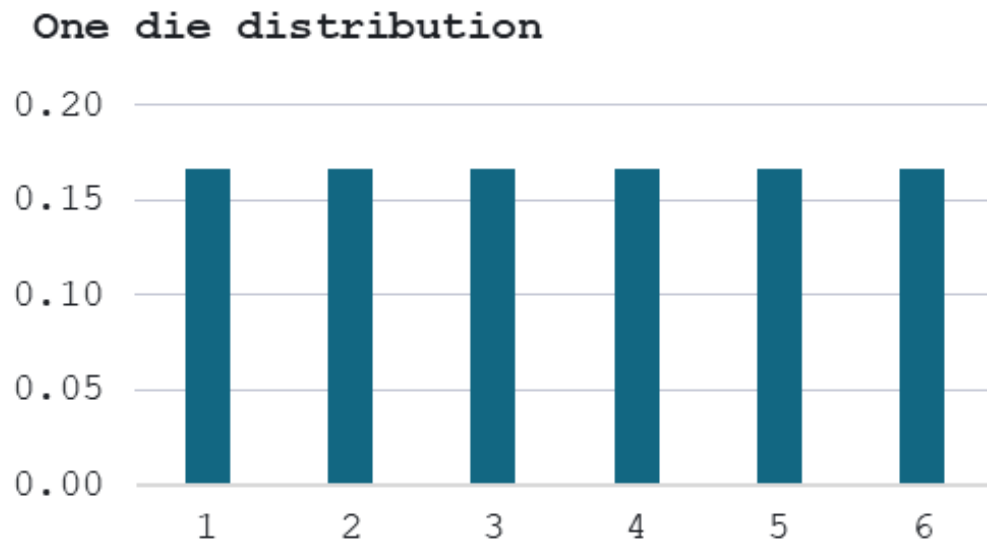
| Outcome      | Probability |
|--------------|-------------|
| 1            | 1/6 or 0.17 |
| 2            | 1/6 or 0.17 |
| 3            | 1/6 or 0.17 |
| 4            | 1/6 or 0.17 |
| 5            | 1/6 or 0.17 |
| 6            | 1/6 or 0.17 |
| 7 (all else) | 0           |

Sum of probabilities = 1 or 100%



# UNIFORM DISTRIBUTION

Discrete data:



Rolling one die:



| Outcome      | Probability |
|--------------|-------------|
| 1            | 1/6 or 0.17 |
| 2            | 1/6 or 0.17 |
| 3            | 1/6 or 0.17 |
| 4            | 1/6 or 0.17 |
| 5            | 1/6 or 0.17 |
| 6            | 1/6 or 0.17 |
| 7 (all else) | 0           |

Sum of probabilities = 1 or 100%



# DISTRIBUTION

36 possible outcomes:

|        |        |        |        |        |        |
|--------|--------|--------|--------|--------|--------|
| (1, 1) | (2, 1) | (3, 1) | (4, 1) | (5, 1) | (6, 1) |
| (1, 2) | (2, 2) | (3, 2) | (4, 2) | (5, 2) | (6, 2) |
| (1, 3) | (2, 3) | (3, 3) | (4, 3) | (5, 3) | (6, 3) |
| (1, 4) | (2, 4) | (3, 4) | (4, 4) | (5, 4) | (6, 4) |
| (1, 5) | (2, 5) | (3, 5) | (4, 5) | (5, 5) | (6, 5) |
| (1, 6) | (2, 6) | (3, 6) | (4, 6) | (5, 6) | (6, 6) |

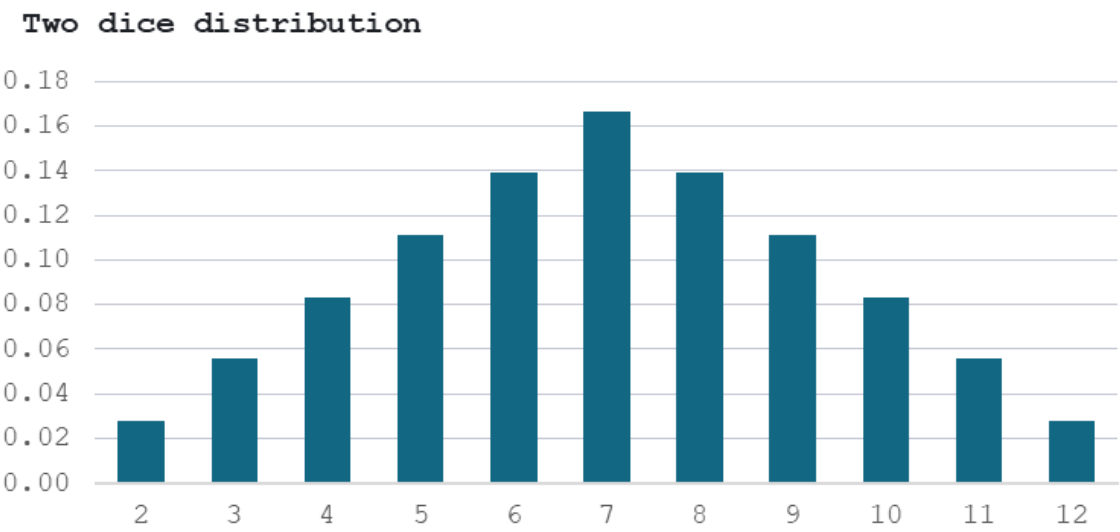
Rolling two dice:

| Sum      | Probability |
|----------|-------------|
| 2        | 0.03        |
| 3        | 0.06        |
| 4        | 0.08        |
| 5        | 0.11        |
| 6        | 0.14        |
| 7        | 0.17        |
| 8        | 0.14        |
| 9        | 0.11        |
| 10       | 0.08        |
| 11       | 0.06        |
| 12       | 0.03        |
| All else | 0           |



# DISTRIBUTION

## Discrete data:



## Rolling two dice:

| Sum      | Probability |
|----------|-------------|
| 2        | 0.03        |
| 3        | 0.06        |
| 4        | 0.08        |
| 5        | 0.11        |
| 6        | 0.14        |
| 7        | 0.17        |
| 8        | 0.14        |
| 9        | 0.11        |
| 10       | 0.08        |
| 11       | 0.06        |
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| All else | 0           |



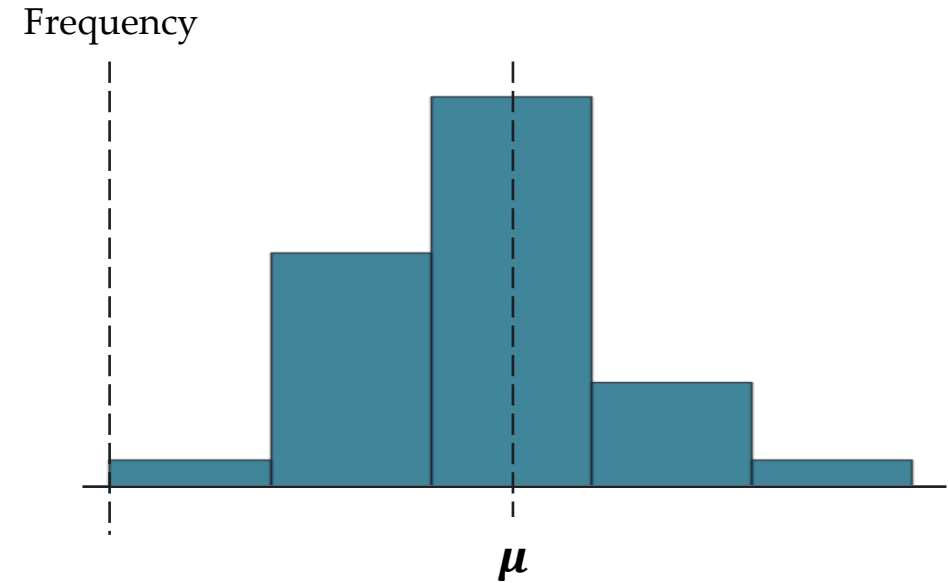


# HISTOGRAM

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Histograms are used to visualize the shape, spread, and central tendency of data, making them a useful tool for assessing whether a dataset follows a normal distribution or deviates from it.

Histogram:



# NORMAL DISTRIBUTION



# NORMAL DISTRIBUTION

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A normal distribution is a probability distribution where the values of a random variable are distributed symmetrically. Also known as Gaussian distribution or bell curve because of its shape.



Johann Carl Friedrich Gauss



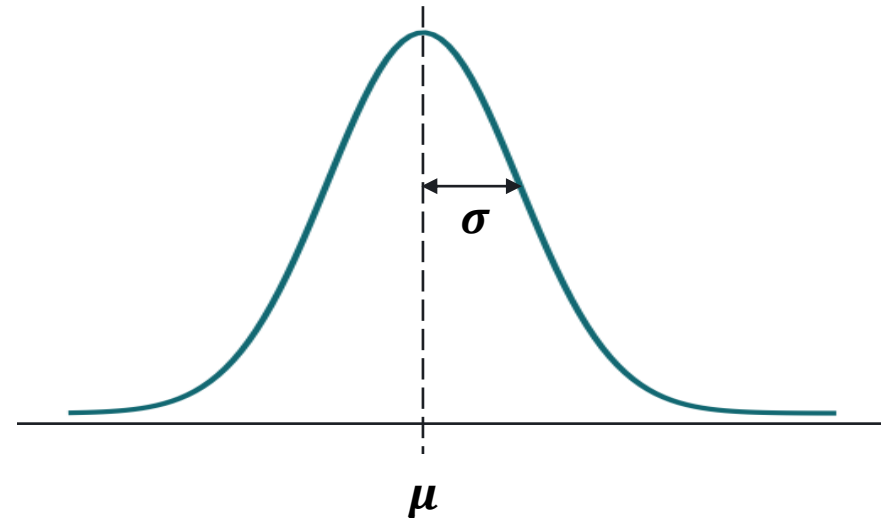
# NORMAL DISTRIBUTION

A normal distribution is a probability distribution where the values of a random variable are distributed symmetrically. Also known as Gaussian distribution or bell curve because of its shape.

Denoted by:

$$N(\mu, \sigma^2)$$

Bell Curve:



mean = median = mode



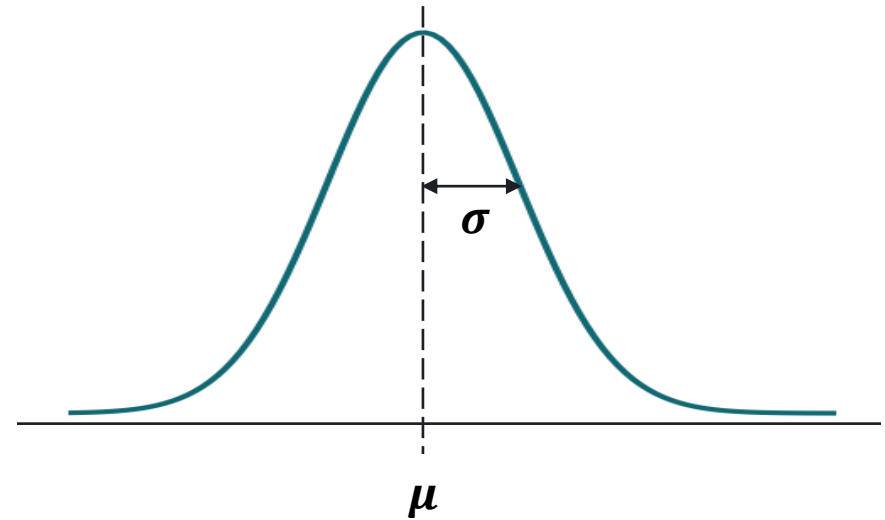
# NORMAL DISTRIBUTION

A normal distribution is a probability distribution where the values of a random variable are distributed symmetrically. Also known as Gaussian distribution or bell curve because of its shape.

Formula:

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

Bell Curve:



mean = median = mode



# LABORATORY

