

Section 6.2 — Standard Normal Distribution

Chris Godbout

Uniform Distribution

Normal Distributions

Uniform Distribution

Graphs of probability distributions

1. The area under the graph of a probability distribution is 1.
2. There is a correspondence between area and probability.

Uniform Distributions

Definition (Uniform Distribution)

A continuous random variable has a **uniform distribution** if its values are spread evenly over the range of possibilities. The graph of a uniform distribution results in a rectangular shape.

Waiting Time

A person can expect to wait 15 minutes between buses.

Waiting Time

A person can expect to wait 15 minutes between buses.

- What is the probability they wait between 7 and 10 minutes?

Waiting Time

A person can expect to wait 15 minutes between buses.

- What is the probability they wait between 7 and 10 minutes?
- What is the probability they wait exactly 2.5 minutes?

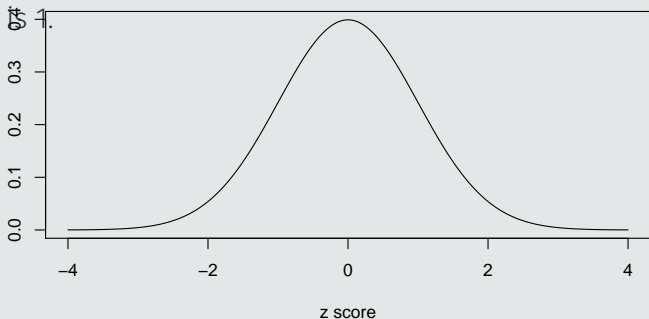
Normal Distributions

What does it mean for a histogram to be a normal distribution?

Standard Normal Distribution

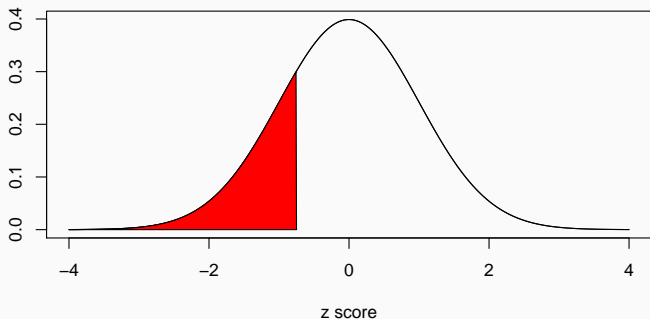
Definition (Standard Normal Distribution)

The **standard normal distribution** is a normal distribution with the parameters $\mu = 0$ and $\sigma = 1$. The total area under its curve



Probabilities and areas

When we look up probabilities, we are talking about the cumulative area from the left.



Finding Probabilities from a z score

- $P(Z < a)$ is the probability that the z-score is less than a .
- $P(Z > a) = 1 - P(Z < a)$ is the probability that the z-score is greater than a .
- $P(a < Z < b) = P(Z < b) - P(Z < a)$ is the probability that the z-score is between a and b .

Examples

- What is the probability that z is less than 2.33?

Examples

- What is the probability that z is less than 2.33?
- What is the probability that z is less than -1.55?

Examples

- What is the probability that z is less than 2.33?
- What is the probability that z is less than -1.55?
- What is the probability that z is greater than -0.82?

Examples

- What is the probability that z is less than 2.33?
- What is the probability that z is less than -1.55?
- What is the probability that z is greater than -0.82?
- What is the probability that z is greater than 0.91?

Examples

- What is the probability that z is less than 2.33?
- What is the probability that z is less than -1.55?
- What is the probability that z is greater than -0.82?
- What is the probability that z is greater than 0.91?
- What is the probability that z is between 0.25 and 1.25?

Examples

- What is the probability that z is less than 2.33?
- What is the probability that z is less than -1.55?
- What is the probability that z is greater than -0.82?
- What is the probability that z is greater than 0.91?
- What is the probability that z is between 0.25 and 1.25?
- What is the probability that z is between -2.11 and 1.15?