Lesson 16: Normal Distributions

Overview

In this lesson, we'll investigate one of the most prevalent probability distributions in the natural world, namely the **normal distribution**. Just as we have for other probability distributions, we'll explore the normal distribution's properties, as well as learn how to calculate normal probabilities.

Objectives

Upon completion of this lesson, you should be able to:

- To define the probability density function of a normal random variable.
- To learn the characteristics of a typical normal curve.
- To learn how to transform a normal random variable X into the standard normal random variable Z.
- To learn how to calculate the probability that a normal random variable X falls between two values a and b, below a value c, or above a value d.
- To learn how to read standard normal probability tables.
- To learn how to find the value x associated with a cumulative normal probability.
- To explore the key properties, such as the moment-generating function, mean and variance, of a normal random variable.
- To investigate the relationship between the standard normal random variable and a chi-square random variable with one degree of freedom.
- To learn how to interpret a Z-value.
- To learn why the Empirical Rule holds true.
- To understand the steps involved in each of the proofs in the lesson.
- To be able to apply the methods learned in the lesson to new problems.

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