Normal Distribution

A **normal distribution** is a continuous probability distribution that is symmetrical around the mean. It is defined by two parameters:

- μ the **mean** (average),
- σ the standard deviation.

The total area under the curve is equal to 1.

Example 1: Heights

The heights of adult men are normally distributed with a mean of μ =175 cm and a standard deviation σ =8 cm.

What is the probability that a randomly selected man is:

- \circ a) Shorter than 180 cm?
- b) Taller than 190 cm?
- \circ c) Between 170 cm and 185 cm?

Example 2: Exam Scores

The results of a standardized math exam are normally distributed with:

- μ=70
- σ=10

Let X be the score of a randomly selected student.

What percentage of students scored:

- \circ a) More than 85?
- b) Less than 60?
- \circ c) Between 65 and 90?

Reverse problem

The weights of apples are normally distributed with mean 150 g and standard deviation 12 g.

What weight corresponds to the top 10% of heaviest apples?

(Hint: Use the z-score for the 90th percentile.)