**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:

* + a) Shorter than 180 cm?
  + b) Taller than 190 cm?
  + 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:

* + a) More than 85?
  + b) Less than 60?
  + 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.)*