

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 $\mu=175$ cm and a standard deviation $\sigma=8$ 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?
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Example 2: Exam Scores

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

- $\mu=70$
- $\sigma=10$

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?
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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.)
