Today we will study

- How to find probabilities for normally distributed variables

Last time we learned how to find the area under The Standard Normal Distribution. Today we will look at one interpretation of that area, as the percentage of all observations of a normally distributed variable that lie within a specific range.

OR-
As a probability: if a member of a population is selected at random, the probability that the observed value of a variable will lie within any specified range.

Probability and Normal Distributions

Some Notation:

- \( P(a < z < b) \) denotes the probability that the \( z \)-score is between \( a \) and \( b \).
- \( P(z > a) \) denotes the probability that the \( z \)-score is greater than \( a \).
- \( P(z < a) \) denotes the probability that the \( z \)-score is less than \( a \).

This section provides methods for working with normal distributions that are not standard. The key concept is that we use the simple transformation formula to standardize any normal distribution.

\[
z = \frac{x - \mu}{\sigma}
\]

Round \( z \) to 2 decimal places

It is important to recognize that the area in any normal distribution bounded by some value \( x \) is the same as the area bound by the equivalent \( z \)-score in the standard normal distribution.

Shaded areas have the same area.