Normal Distributions

*Normal distributions* are the most important distributions. A normal distribution is specified by giving its *mean* $\mu$ and its *standard deviation* $\sigma$. The normal distribution with mean $\mu$ and standard deviation $\sigma$ is denoted $N(\mu, \sigma)$. For example, $N(120, 15)$ denotes the normal distribution with mean $\mu = 120$ and standard deviation $\sigma = 15$.

The special normal distribution $N(0, 1)$ is called the *standard normal distribution*. We’ll look at this first.

1. To the right is a graph of the standard normal distribution $N(0, 1)$. The region under the graph between the values -1 and 1 is shaded.

   (a) Estimate the area of this shaded region.

   (b) What does this area mean in terms of a proportion of values in this distribution?

2. To the right is a graph of the standard normal distribution $N(0, 1)$. The region under the graph between the values -2 and 2 is shaded.

   (a) Estimate the area of this shaded region.

   (b) What does this area mean in terms of a proportion of values in this distribution?

3. To the right is a graph of the standard normal distribution $N(0, 1)$. The region under the graph between the values -3 and 3 is shaded.

   (a) Estimate the area of this shaded region.

   (b) What does this area mean in terms of a proportion of values in this distribution?
4. Below is a graph of the standard normal distribution \( N(0, 1) \).

(a) Shade in the region below the graph to the left of the value \(-1\).
(b) Estimate the area of this shaded region.

5. Below is a graph of the standard normal distribution \( N(0, 1) \).

(a) Shade in the region below the graph to the left of the value 2.
(b) Estimate the area of this shaded region.

6. Below is a graph of the standard normal distribution \( N(0, 1) \).

(a) Shade in the region below the graph between the values \(-1\) and 2.
(b) Estimate the area of this shaded region.