The lifetimes of a certain brand of light bulbs are normally distributed with a mean of 1000 hours and a standard deviation of 100 hours. What is the probability that a randomly selected light bulb lasts between 900 and 1100 hours? Data: Mean lifetime(μ) = 1000 hours, Standard deviation (σ) = 100 hours, Lifetime range (lower limit x1, upper limit x2)

**Standardise the variable**

The lifetime *X* is normally distributed

Convert the limits to standard normal Z:

,

**Use the standard normal cumulative distribution function (CDF)**

The required probability is

**Look up the values**

From standard normal tables (or a calculator):

Therefore:

Rounded to two decimal places, the probability is **0.68** (68 %).

This is the classic “68‑95‑99.7 rule”: about 68 % of a normal distribution lies within one standard deviation of the mean.