Chapter 6
Continuous Random Variables

1 Continuous Probability Distributions

$$f(x) = \text{probability curve (density curve, density function)}.$$

Properties:

1. $f(x) \geq 0$ for all x

2. The total area under the curve of $f(x)$ equals to 1

Essential point: An area under a continuous probability distribution is a probability

2 The Normal Probability Distribution

Normal distribution $\Longrightarrow$ Standard normal distribution: $z = \dfrac{x - \mu}{\sigma}$

Standard normal distribution $\Longrightarrow$ Normal distribution: $x = \mu + z\sigma$
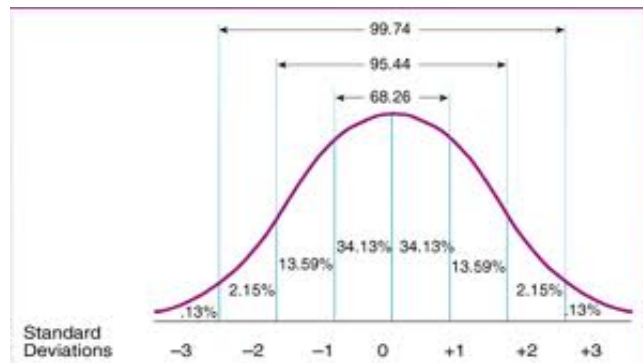
Note: Standard normal distribution has $\mu_x = 0$ and $\sigma_x = 1$

Figure 1: The standard normal distribution