

## Chapter 5

1. What is the probability that a continuous random variable falls in a given range.?

$$P(a < X < b) = F(b) - F(a)$$

2. What are the properties of a probability density function?

*$f(x) > 0$  for all values of  $x$ . The area under the probability density function over all values of the random variable is equal to 1.0. The probability that  $X$  lies between  $a$  and  $b$  is the area under the probability density function between these points. The cumulative distribution function is the area under the probability density function up to  $x_0$ .*

3. How does the probability density function look at a normal distribution?

*A symmetrical bell-shaped curve with the average as the center.*

4. What is the notation of the normal distribution?

$$X \sim N(\mu, \sigma^2)$$

5. What is the formula for a normally distributed random variable, and  $Z$ ?

$$Z = \frac{X - \mu}{\sigma}$$