

ECON 216 - Exam 2 Formula Sheet - Spring 2023 - Dr. Sara Esfahani

1st and 2nd moments of a continuous random variable

Combination Formula

$$C_n^N = \binom{N}{n} = \frac{N!}{n! \times (N-n)!}$$

Permutation Formula

$$P_n^N = \frac{N!}{(N-n)!}$$

Probability

$$\text{Probability} = \frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$$

Probability of the Union of two Events

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

Conditional Probability

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

Multiplication Law

$$P(A \cap B) = P(A|B) \times P(B)$$

$$P(A \cap B) = P(B|A) \times P(A)$$

Independent Events

$$P(A|B) = P(A)$$

$$P(B|A) = P(B)$$

$$E(x) = \mu = \int x f(x) dx$$

$$\text{Var}(x) = \sigma^2 = \int (x - \mu)^2 f(x) dx$$

Uniform Probability Distribution

$$f(x) = \begin{cases} \frac{1}{b-a} & \text{for } a \leq x \leq b \\ 0 & \text{elsewhere} \end{cases}$$

$$F(c) = \text{Prob}(x \leq c) = \frac{c-a}{b-a}$$

$$E(x) = \mu = \frac{a+b}{2}$$

$$\text{Var}(x) = \sigma^2 = \frac{(b-a)^2}{12}$$

Normal Probability Distribution

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$$

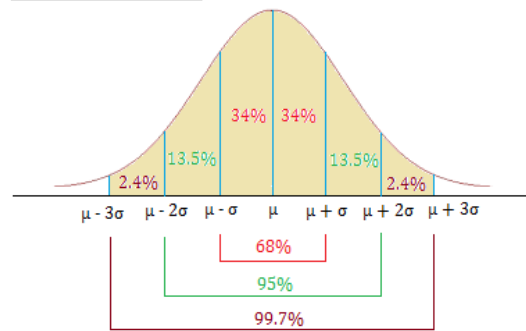
$$E(x) = \mu$$

$$\text{Var}(x) = \sigma^2$$

Converting to Standard Normal Random Variable

$$z = \frac{x - \mu}{\sigma}$$

Empirical Rule



Empirical rule