MIDTERM 1 FORMULA SHEET

Miscellaneous Formulae

Please note- it is up to you to understand what each formula means, and it is also up to you to know which formula you need to use in a given situation. We (the Course Staff) will not be able to answer any questions about these formulas during the Exam.

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i \qquad s_X^2 = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2 \qquad s_X = \sqrt{s_X^2}$$

$$\text{IQR} = Q_3 - Q_1 \qquad \text{range}(X) = \max\{X\} - \min\{X\}$$

$$0 \le \mathbb{P}(A) \le 1 \qquad \mathbb{P}(\varnothing) = 0 \qquad \mathbb{P}(\Omega) = 1$$

$$\mathbb{P}(A^{\complement}) = 1 - \mathbb{P}(A) \qquad \mathbb{P}(A \cup B) = \mathbb{P}(A) + \mathbb{P}(B) - \mathbb{P}(A \cap B)$$

$$\mathbb{P}(E \mid F) = \frac{\mathbb{P}(E \cap F)}{\mathbb{P}(F)} \text{ provided that } \mathbb{P}(F) \neq 0$$

$$\mathbb{P}(E \mid F) = \frac{\mathbb{P}(F \mid E) \cdot \mathbb{P}(E)}{\mathbb{P}(F)} \text{ provided that } \mathbb{P}(E) \neq 0 \text{ and } \mathbb{P}(F) \neq 0$$

$$E \perp F \text{ if any of: } \mathbb{P}(E \mid F) = \mathbb{P}(E); \quad \mathbb{P}(F \mid E) = \mathbb{P}(F); \quad \mathbb{P}(E \cap F) = \mathbb{P}(E) \cdot \mathbb{P}(F)$$

$$0! = 1 \qquad \mathbb{P}(E) = \mathbb{P}(E \cap F) + \mathbb{P}(E \cap F^{\complement})$$

$$n! = n \times (n-1) \times \cdots \times 2 \times 1 \qquad (n)_k = \frac{n!}{(n-k)!} \qquad \binom{n}{k} = \frac{n!}{k! \cdot (n-k)!}$$