Assigment #1 Applied Statistics 2023-2024 Academic year
Due on Saturday 23, June 2023

Exercise 1
Consider X a random variable having the following pdf.

$$f_X(x) = \frac{\beta}{\alpha^\beta} x^{\beta-1} \exp\left(-\left(\frac{x}{\alpha}\right)^\beta\right) \quad \alpha, \beta > 0$$

a) Express the cummulative distribution function (cdf).

b) Deduce the expression of the Expected value and Variance.

Exercise 2
Let A and B be two given set. Prove that $A = \emptyset$ iff $B = (A \cap \overline{B}) \cup (\overline{A} \cap B)$. **Exercise 3**

a) Show that $f_X(x) = \frac{1}{(1+x)^2}, x \in \Re^+$ is a probability density function.

b) Express $F_X(x)$ the cdf of random variable X.

c) compute $P(X \leq 1)$

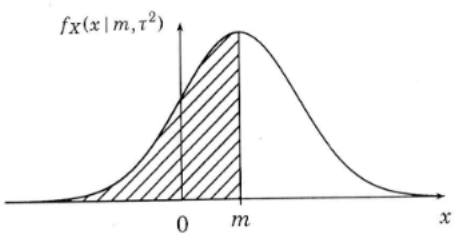
d) compute $P(X \geq 3)$

Exercise 4
Let X be a random variable defined on $\{3, 6.8\}$. Suposse that $P(X = 3) = 1/3$ and $P(X = 6) = 1/6$.

a) Compute $E(x)$

b) Compute $Var(x)$

Exercise 5
Consider $X \approx N(m, \sigma^2)$ which pdf is represented below



1. What is the value of hatched part on the graph?
2. What is the value of $P(X > m)$

Exercice 6
Consider the height measurements of 25 students given in table below. The 25 observations in ascending order are 152 162 154 167 155 170 159 170 159 170 160 170 160 171 160 172 160 172 160 172 160 172 161 161 173 .
Summarized the data in frequency table
Calculate
range, mean, median, mode, variance, standard deviation, and interquantile range

GOOD LUCK