Section 11/2

1 Question 10.1

Let $X_1, X_2, X_3, \ldots$ be i.i.d. with density given by

$$f(x) = \begin{cases} 0 & x \leq 50 \\ \frac{c}{x^4} & x \geq 50 \end{cases}$$

This is one of the Pareto densities, sometimes used in economics to represent distributions of wealth in populations where a small percent of the population owns a large percent of the wealth.

a) Find c.

b) Find the cdf of X_1 and sketch its graph.

c) Find $E(X_1)$.

d) Find $Var(X_1)$.

e) Let $\bar{X}_n = \sum_{i=1}^{n} X_i$. Find or approximate $P(\bar{X}_{100} > 70)$.

2 Question 10.2

A class starts at 3:10 p.m. Seven students in the class arrive at random times $T_1, T_2, \ldots, T_7$ that are i.i.d. with the uniform distribution on the interval 3:07 to 3:12.

a) Find $E(T_1)$.

b) What is the chance that all seven students arrive before 3:10?

c) Let $X = max(T_1, T_2, \ldots, T_7)$ be the time when the last of the seven students arrives. Find $F(x)$.