

Math 342 — Expectation and variance

Problem 1. Suppose X is a continuous random variable with density

$$f(x) = \begin{cases} c & -2 \leq x \leq 5 \\ 0 & \text{otherwise.} \end{cases}$$

- Draw a graph of f and find c .
- Give the name of the distribution of X .
- Find $E[X]$ and $V(X)$.

Problem 2. Suppose X is a continuous random variable with density

$$f(x) = \begin{cases} 4e^{-4x} & x > 0 \\ 0 & x \leq 0. \end{cases}$$

- Draw a graph of f .
- Find $E[X]$ and $V(X)$.

Problem 3. Let X denote the weekly CPU time used by an accounting firm (measured in hours), and suppose X has pdf given by

$$f(x) = \begin{cases} \frac{3}{32}x(4-x) & 0 \leq x \leq 4 \\ 0 & \text{otherwise.} \end{cases}$$

- Draw a graph of f .
- Find $E[X]$ and $V(X)$.
- The CPU time costs the firm 200 dollars an hour, plus a fixed base cost of 50 dollars per week. Let C denote the total cost in a given week. Find $E[C]$ and $V(C)$.