

18.440 problem set 5, due Friday, Oct. 21, 2005

1. Let $f(x) = c(2 - x)$ for $0 \leq x \leq 2$ and $f(x) = 0$ elsewhere.
 - (a) Evaluate c so that f is a probability density.
 - (b) If X has density f , find the distribution function $F(x) = P(X \leq x)$ for all x .
 - (c) Is $F(x) = 1$ for $x \geq 2$? If not, recheck (a) and (b).
2. For X in Problem 1, evaluate (a) EX and (b) $\text{Var}(X)$.
3. For the uniform distribution $U[1, 3]$ on the interval $[1, 3]$,
 - (a) What is its density function $f(x)$?
 - (b) What is its distribution function $F(x)$?
 - (c) What are the mean EX and variance $\text{Var}(X)$ of a random variable with this distribution?
 - (d) Let X_1, X_2, \dots , be independent with this distribution and $S_n = X_1 + \dots + X_n$. Find the mean and variance of S_{30} .

In the next two problems, the numbers in Ross are the same in the 6th and 7th editions.
4. Ross Chap. 5, Problem 15, but for $\mu = 12$ instead of 10, and do parts (a), (b), and (c) only.
5. Ross Chap. 5 Problem 24.