18.440 Probability and Random Variables
Spring 2009

18.440 problem set 6

Problems 1-2 are from Ross, 7th or 8th Ed.

1. Chap. 5, Problem 21 or 5.21. Interpret the second question as: what is the conditional probability of a height over 6 ft. 5 in. given that the height is at least 6 feet?

2. Chap. 5, Problem 36 or 5.36.

3. Let $f(x) = cx^{11}(1-x)^{17}$ for $0 < x < 1$ and 0 elsewhere. Evaluate the constant c (numerically) so that f is a probability density.

4. A type of light bulb has an exponentially distributed lifetime T with $ET = 1,200$ hours. A new tenant finds a bulb of unknown age in a fixture. The tenant has a second, spare bulb and will use it when the first bulb burns out. Find the probability that after 3000 hours with the fixture turned on, a third bulb is not yet needed.

5. There are two offices A and B. In each office is a computer with a hard disk. The hard disks have an exponentially distributed lifetime with expectation 3 years. When a hard disk fails it is replaced by a new one. Find the probability that three consecutive hard disks have failed in office A before the original one fails in office B.