Math 340
Fall 09
Dr. Sethuraman
HW 6
Due Wednesday Nov 11th

1. A random variable Y has density function given by

$$f(Y) = \begin{cases} (3/2)y^2 + y & \text{for} \quad 0 \leq y \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

   Find the mean and variance of Y.

2. The proportion of time Y that an industrial robot is in operation during a 40 hour week is a random variable with probability density function

$$f(Y) = \begin{cases} 2y & \text{for} \quad 0 \leq y \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

   The profit X per week obtained as a result of using this robot is given by $X = 200Y - 60$. Find the mean and variance of X.

3. In Example 2, page 270 of the text, find the probability density function of the x coordinate of the bacteria.

4. The time it takes a commuter to travel from home to the nearest train station is uniformly distributed between 15 and 20 minutes. The train leaves at exacly 7:30 AM. Find the probability that the commuter catches the train if she leaves home at 7:12 AM.