Homework 5

1. The density function f of a random variable X is given by:

$$f(x) = \begin{cases} A + Bx^2 & \text{if } 0 < x < 1 \\ 0 & \text{otherwise.} \end{cases}$$

   If E(X) = 3/5, find A and B.

2. If X is a normal random variable with mean 10 and variance 36, compute the following values

   (a) $P(X > 5)$

   (b) $P(4 < X < 16)$

   (c) $P(X < 8)$

3. If 65 percent of the population of a large community is in favor of a proposed rise in school taxes, approximate the probability that a random sample of 100 people will contain:

   (a) at least 50 who are in favor of the proposition,

   (b) between 60 and 70 inclusive who favor the proposition,

   (c) fewer than 75 in favor.

4. On thousand independent rolls of a fair die will be made. Compute an approximation to the probability that the number 6 will appear between 150 and 200 times.

5. Suppose that X is a normal random variable with mean 12 and variance 4.

   Find the value of c such that $P(X > c) = .10$.

6. The number of years that a radio functions is exponentially distributed with $\lambda = 1/8$. If Jones buys a used radio, what is the probability that it will be working after an additional 8 years?