Recitation 11
March 17, 2005

1. Let X, Y, and Z be independent random variables. X is Bernoulli with $p = 1/4$. Y is exponential with parameter 3. Z is Poisson with parameter 5.
   (a) Find the transform of $5Z + 1$.
   (b) Find the transform of $X + Y$.
   (c) Consider the new random variable $U = XY + (1 - X)Z$. Find the transform associated with U.

2. Suppose that
$$M_X(s) = \frac{1}{3} \cdot \frac{1}{1-s} + \frac{2}{3} \cdot \frac{3}{3-s}.$$
What is the PDF of X?

3. Let X be a random variable such that
$$M(s) = a + be^{2s} + ce^{4s}, \quad \mathbf{E}[X] = 3, \quad \mathrm{var}(X) = 2.$$
Find a, b, and c, and the PMF of X.