1. Prob. 79, p. 121, Gubner
2. Prob. 2, p. 151, Gubner, and also find the mean.
4. Prob 5b, p. 152, Gubner.
5. Prob. 6b, p. 152, Gubner.
6. Prob. 11 a, p. 154, Gubner.
7. Prob. 35, p. 159, Gubner, except instead of the given moment generating function, assume we are given the characteristic function \( \phi_X(v) = e^{-\sigma^2 v^2/2} \)
8. Prob. 37, p. 111, Gubner, but use the characteristic function rather than the moment generating function.
11. Let \( X \) and \( Y \) be independent and identical discrete random variables with probability mass functions 
\[ p_X(k) = p_Y(k) = (1-q) q^k, \quad k = 0, 1, \ldots \] 
where \( 0 < q < 1 \).
Let \( Z = X - Y \).
(a) Find the characteristic function of \( X \) in closed form.
(b) Find the characteristic function of \( Z \).
12. Find the probability distribution of the random variable \( X \) corresponding to the following characteristic function:
\[
\phi_X(v) = \frac{e^{3jv}}{3} + \frac{e^{4jv}}{4} + \frac{5e^{5jv}}{12}
\]