HOMEWORK SET #5

1. Assume that X is $N(0, 1)$, B satisfies $P(B = 1) = P(B = -1) = 1/2$, and B is independent of X. Define $Y = B|X|$.

   (a) Find the distribution of Y.
   (b) Find $\text{Cov}(X, Y)$.
   (c) Are X and Y independent? Explain.

2. Let $Y \sim \chi^2(p, \lambda)$.

   (a) Show that if $Y \sim \chi^2(p, \lambda)$ then $EY = p + \lambda$, $\text{Var}(Y) = 2(p + 2\lambda)$.
   (b) Find the moment generating function of Y.

3. From book 7.4, 7.5, 9.2, 10.2 (skip a)