Due: Thursday, March 27th, 2014
Problem to be turned in: None

1. Find the characteristic functions of the following random varibables:
   (a) $X \stackrel{d}{=} \text{Geometric}(p), p \in (0,1)$
   (b) $Y = \sum_{i=1}^{n}$ when $n \geq 1$ and each X_i is i.i.d $X \stackrel{d}{=} \text{Poisson}(\lambda), \lambda > 0$
   (c) $Y = 3X + 2$ when $X \stackrel{d}{=} \text{Uniform}(\{1 \ldots, n\})$
2. Suppose X has a p.d.f given by
$$f_X(x) = \frac{1}{2} e^{-|x|}, \ -\infty < x < \infty.$$
   Find the characteristic function of X.
3. Suppose X has a p.d.f given by
$$f_X(x) = \begin{cases} x & 0 \leq x \leq 1 \\ 2 - x & 1 \leq x \leq 2 \\ 0 & \text{otherwise} \end{cases}$$
   Find the characteristic function of X.
4. Suppose $X \stackrel{d}{=} N(\mu, \sigma^2)$. Find $E(\cos(tX)$.