Probability and Statistics

Home Work due Feb 24, 2005.

Q1. If X_1 and X_2 are independent and uniformly distributed in $[0,1]$ what is the probability distribution of $Y = X_1 - X_2$?

Q2. If X_1 and X_2 are independent and have the exponential distribution with density $f(x) = e^{-x}$ for $x \geq 0$, what is the distribution of $Y = X_1 - X_2$?

Q3. Calculate the moment generating function of

$$\frac{1}{n!}\int_0^\infty e^{\theta x} e^{-x} x^n dx$$

of the distribution with density $\frac{1}{n!}e^{-x}x^n$ on $[0,\infty]$.