Math 461
HW 8
Due 11/9/10

1. A random variable X takes values on the interval $[0,1]$ and has pdf $f_X(x) = \alpha(x - x^4)$, $0 \le x \le 1$ and is 0 otherwise. Determine α, the cdf $F_X(x)$ for all x, $E(X)$ and $\mathrm{Var}(X)$.

2. Suppose X and Y are independent normal random variables where $E(X) = 4$ and $SD(X) = 6$, $E(Y) = 2$ and $SD(Y) = 3$. Let $Z = X - 2Y$. Describe Z in terms of the distributions given in this case.

3. Suppose X and Y are independent random variables, where X is uniformly distributed on $[-1, 3]$ and Y is exponentially distributed with mean 2.

Express $P(X \ge Y)$ as an integral $\iint_R f(x,y)\,dA$, where R is an explicitly sketched region in the plane and $f(x,y)$ is an explicit function. It is not necessary to write the integral in iterated form and it is not necessary to evaluate the integral.

4. Suppose you arrive at a coffeeshop at a normally distributed time, with mean 9:00 am and standard deviation 15 minutes. You stay at the coffeeshop for a length of time which is independent of your arrival, which is normally distributed, with mean 45 minutes and standard deviation 20 minutes. What is the probability you are still at the coffeeshop at 10:00 am. (Hint: I'd measure my (time) random variables in units of minutes, and set the "origin" at 9:00 am.)