Quiz 6

March 20, 2015

1. Consider a continuous random variable X with the pdf

$$f(x) = \begin{cases} \frac{k}{x^4} & \text{when } x > 1 \\ 0 & \text{otherwise} \end{cases}.$$

   (a) Determine the value of k for which $f(x)$ is a legitimate pdf. Show your work.
   We note that

$$\int_1^\infty \frac{k}{x^4} dx = -\frac{k}{3x^3}|_1^\infty = \frac{k}{3} = 1.$$

   Thus $k = 3$.

   (b) Find $E(X)$.
   We note that

$$E(X) = \int_1^\infty x\frac{3}{x^4} dx = -\frac{3}{2x^2}|_1^\infty = \frac{3}{2}.$$

2. Consider the Standard normal distribution Z. Find the constant c so that

   (a) $P(Z \leq c) = 0.9838$. Show your work.
   The location of 0.9838 on the table is $c = 2.14$.

   (b) $P(-c \leq Z \leq c) = 0.668$. Show your work.
   We have $P(Z \leq c) = 0.5 + (0.668/2) = 0.834$. We find 0.834 on the table and have $c = 0.97$.