STA2112f99 Assignment for Quiz 6

1. Prove that if $P(0 \leq Y \leq 1) = 1$, then $Var(Y) \leq \frac{1}{4}$.

2. I believe that if $P(0 \leq Y \leq 1) = 1$ with $E(Y) = \mu$, then $Var(Y) \leq \mu(1-\mu)$. Can you prove it?

3. Differentiate both sides of $\sum_{x=0}^{\infty} \frac{e^{-\lambda}\lambda^x}{x!}$ and see if you can get something interesting. Justify the exchange of summation and differentiation.

4. Let $f_X(x) = \frac{1}{x^2} I\{x > 1\}$. For what values of t does $E(e^{Xt})$ converge uniformly?

5. Let Y be Poisson(λ). Show $f(x+1) = \frac{\lambda}{x+1} f(x)$

6. Take a look at the clever way our text gets the mean of a lognormal distribution using moment generating functions. Use the same approach to find the variance.

7. Do problems 3.4, 3.9, 3.17, 3.21