MA381 Introduction to Probability, HW 10

Instructions: This homework will be collected at the beginning of class Monday, Jan. 25. Some problems will be graded in depth; remaining problems will be awarded completion credit. Late HW's are not accepted.

0: Be sure to read chapter 7, section 7.3, and chapter 6, section 6.2.

1: Problem 1, pg. 290.

2: Let Y be an exponential RV with parameter $\lambda = \lambda_o$. Prove that $\mu_Y = 1/\lambda_o$ and $\sigma_Y^2 = 1/\lambda_o^2$ using integration by parts. Show your work for credit.

3: Let Y be an exponential RV. Prove that Y is "memoryless," i.e.,

$$P(Y > t + s \mid Y > t) \quad = \quad P(Y > s).$$

4: Problem 5, pg 290.

5: Problem 3, pg. 245.

6: Problem 5, pg. 245.

7: Suppose that the RV U is uniform on the interval $(0, 1)$. Show that $Y = F^{-1}(U)$ is an exponential RV if $F^{-1}(u) = -\ln(1-u)/\lambda$, i.e. F^{-1} is the inverse of the exponential CDF, $F(y) = 1 - e^{-\lambda y}$. This fact is a special case of a more general result known as the *Probability Integral Transform.*

8: Problem 7, pg. 259 (**NOT** page 246.)