

Pledge:

11/19/2007
Dr. Lunsford

MATH 371
Quiz 3

Name: _____
35 Points Possible

This quiz is closed notes and closed book. Please show all of your work on separate sheets of paper. Attach this sheet to the front of your work. If you use your calculator distribution key, please indicate your calculator input.

I. If the p.d.f. of the continuous random variable X is given by $f(x) = \theta x^{\theta-1}$ for $0 < x < 1$ and θ a fixed positive constant, then use a distribution function technique to find the p.d.f. of Y where $Y = -2\theta \ln(X)$. (6 points – this problem inspired by practice problem 3.5-11)

II. A manufacture of 12 oz. soft drinks claims they fill their cans so that the weight of the cans follows a normal distribution with mean 12.2 ounces and standard deviation 0.1 ounces. Please answer the following: (5 points each - 10 points total – this problem inspired by practice problem 5.2-25)

- (a) If a full can of this soft drink is selected at random, what is the probability it will contain less than 12 ounces of soft drink?
- (b) If 50 cans are selected independently (at random), then what is the probability that at least one of the cans will contain less than 12 ounces of soft drink?

III. If Z is a standard normal random variable, then find a real number c such that $P(|Z| < c) = 0.86$. (5 points – this problem inspired by practice problem 5.2-5).

IV. The joint density function for the continuous random variables X and Y is given by $f(x, y) = 2e^{-x-y}$ for $0 \leq x \leq y < \infty$. The marginal distribution of X is given by $f_x(x) = 2e^{-2x}$ for $0 \leq x < \infty$. Please answer the following (14 points total – this problem inspired by practice problem 4.1-9).

- (a) Find the marginal distribution of Y . (6 points)
- (b) Are X and Y independent random variables? Why or why not? (2 points)
- (c) Find $P(Y \leq 2X - 2)$. (6 points)