Econ 103 – Quiz 3

Name: _____

Instructions: This is closed-book, closed-notes quiz. Please write your answers in the blanks provided. Each question is worth one point but no partial credit will be awarded. Non-programmable calculators are permitted.

1. A continuous random variable X has a probability density function $f(x)$. It is possible that for some value we have $f(x) > 1$. True or false?

   1. _____

2. The random variable X follows a Uniform(0,1) distribution. Write down its probability density function, $f(x)$ as a piecewise function (Hint - make sure you consider all possible cases for x)

   2. _____

3. The random variable X follows a Uniform(0,1) distribution. Write down its CDF, $F(x_0)$ as a piecewise function (Hint - make sure you consider all possible cases for x_0)

   3. _____

4. The random variable X follows a Uniform(0,1) distribution. What is $P(0.3 \leq X \leq 0.5)$?

   4. _____

5. Suppose $X \sim N(\mu, \sigma^2)$. What is $P(\mu - 2\sigma \leq X \leq \mu + 2\sigma)$?

   5. _____

6. Suppose $X_1, X_2, X_3 \sim i.i.d. N(\mu, \sigma^2)$. Let $\bar{X} = (X_1 + X_2 + X_3)/3$. What is the distribution of $\bar{X}$?

   6. _____

7. Suppose $X_1, X_2, \ldots, X_5 \sim i.i.d. N(0, 1)$. Let $W = X_1^2 + X_2^2 + \ldots + X_5^2$. What is the distribution of W?

   7. _____

8. Suppose $X_1, X_2, X_3 \sim i.i.d. N(0, 1)$. Let $Y = X_3/\sqrt{(X_1^2 + X_2^2)/2}$. What is the distribution of Y?

   8. _____