Econ 103 – Quiz 4

Name: _____

Instructions: This is closed-book, closed-notes quiz. Please write your answers in the blanks provided. Non-programmable calculators are permitted.

1. (2 points) Suppose you have $X_1, ...X_n \sim iid\, N(\mu_x, \sigma_x^2)$ independently of $Y_1, ...Y_m \sim iid\, N(\mu_y, \sigma_y^2)$.

   What is the sampling distribution of the difference of sample means?

   a. Normal distribution

   b. t-Distribution

   c. χ^2 distribution

   d. F-distribution

   1. _____

2. (1 points) True or false? The central limit theorem says that sample means are approximately normally distributed if the sample size is large enough, even if the population is distributed chi-squared.

   2. _____

3. (1 points) True or false? The central limit theorem says that sample means are approximately normally distributed only when the sample size is very small.

   3. _____

4. (2 points) Suppose you have $W_1, ...W_{12} \sim iid\, N(2, \sigma_w^2)$ independently of $V_1, ...V_6 \sim iid\, N(1, \sigma_v^2)$.

   You don't know σ_w^2 and σ_v^2 . You can be sure that the random variable $\frac{\left(\bar{W}_{12} - \bar{V}_6 - (2-1)\right)}{\sqrt{\frac{S_w^2}{12} + \frac{S_v^2}{6}}}$ follows a:

   a. Normal distribution

   b. t-Distribution

   c. χ^2 distribution

   d. F-distribution

   4. _____

5. (2 points) Suppose you have $W_1, ...W_{12} \sim iid\, N(3, 1)$ independently of $V_1, ...V_6 \sim iid\, N(2, 1)$.

   The random variable $\frac{\left(\bar{W}_{12} - \bar{V}_6 - (3-2)\right)}{\sqrt{\frac{1}{12} + \frac{1}{6}}}$ follows a:

   a. Standard Normal distribution

   b. Normal distribution $N(\mu = 1, \sigma^2 = 1)$

   c. χ^2 distribution

   d. F-distribution

   5. _____

6. (3 points) The results of a recent survey suggests that 25% of Americans are able to hold a conversation in a second language. For this survey 1,000 people were polled. Use the Central Limit Theorem to construct an approximate 95% confidence interval for the actual proportion of Americans that are able to hold a conversation in a second language.

6. _____