**ECO 173: Applied Statistics**

**Chapter 9: Sampling Distribution**

Worksheet 2

1. A normally distributed population has a mean of 40 and a standard deviation of 12. What does the central limit theorem say about the sampling distribution of the mean if samples of size 100 are drawn from this population?
2. **An increase in sample size causes the variance of the sampling distribution of sample mean to:**

(a) increase.

(b) decrease.

(c) not change.

(d) increase, then decrease.

1. **The Central Limit Theorem tells us that**

(a) $\overbar{x}$ is distributed normally for all sample sizes when the population is normally distributed.

(b) $\overbar{x}$ is distributed normally for sample sizes ≥ 30 when population distribution is non-normal.

(c) $\overbar{x}$ is distributed normally for sample sizes ≥ 30 when population distribution is unknown.

(d) all of the above are part of the Central Limit Theorem.

1. **A nursery sells trees of different types and heights. These trees average 60 inches in height with a standard deviation of 16 inches. Suppose that 75 pine trees are sold for planting at City Hall. What is the mean of the sampling distribution of sample mean?**

(a) 75

(b) 60

(c) 16

(d) 1.85

1. **Refer to question 4. What is the standard deviation for the sample mean?**

(a) 1.85

(b) 3.41

(c) 4

(d) 16

1. Contents of a 32-Ounce Bottle: The foreman of a bottling plant has observed that the amount of soda in each 32-ounce bottle is actually a normally distributed random variable, with a mean of 32.2 ounces and a standard deviation of 0.3 ounce.
2. If a customer buys **one** bottle, what is the **probability that the bottle** will contain more than 32 ounces?
3. If a customer buys a carton of **four** bottles, what is the **probability that the mean amount of the four bottles** will be greater than 32 ounces?
4. The heights of North American women are normally distributed with a mean of 64 inches and a standard deviation of 2 inches.
5. What is the probability that a randomly selected woman is taller than 66 inches?
6. A random sample of four women is selected. What is the probability that the sample mean height is greater than 66 inches?
7. What is the probability that the mean height of a random sample of 10 women is greater than 66 inches?