# Chapter 10: Estimation and Hypothesis Testing for Two Population Parameters

## Multiple Choice

*This activity contains 10 questions.*

1. **Calculate the standard error of $\bar{x}_1 - \bar{x}_2$ when**
[Hint] $\sigma_1^2 = 8.7 \quad \sigma_2^2 = 13.3$

$n_1 = 45 \quad n_2 = 67$

- 0.392
- 0.559
- 0.626
- 0.638

2. **Develop a 95% confidence interval to estimate the difference in SAT math scores from students in Delaware and New jersey. A sample of 45 students from Delaware had an average score of 560 with a standard deviation of 110 while a sample of 40 New Jersey students had an average score of 530 with a standard deviation of 115.**
[Hint]

- -9.20 to 69.20
- -29.78 to 89.78
- 9.42 to 50.58
- -17.98 to 77.98

3. **Calculate the z-test statistic to test the difference in SAT math scores from students in Delaware and New jersey. A sample of 45 students from Delaware had an average score of 560 with a standard deviation of 110 while a sample of 40 New Jersey students had an average score of 530 with a standard deviation of 115.**
[Hint]

- 0.56
- 0.89
- -1.56
- 1.23

**4.** [Hint]

**When $\sigma^2_1$ and $\sigma^2_2$ are not known, they can be replaced with $s^2_1$ and $s^2_2$ if what condition is met?**

- Equal variances
- Large samples (i.e. greater than 30)
- Normal populations
- Ordinal data

**5.** [Hint]

**When the population standard deviation is unknown and the sample sizes are small, which of the following is <u>not</u> one of the assumptions made for estimating the difference between population means?**

- The populations are normally distributed.
- The populations have equal variances.
- The samples are independent.
- The samples are the same size.

**6.** [Hint]

**Two samples were obtained with the following standard deviations: $s_1 = 3.75$ and $s_2 = 6.25$; which of the following is a possible value for the pooled standard deviation?**

- 3.0
- 3.75
- 4.0
- 10.0

7. [Hint] **A company tracks satisfaction scores based on customer feedback from individual stores on a scale of 0-100. The following data represents the customer scores from Store #1 and #2.**

| | |
|---|---|
| $\bar{x}_1 = 88.3$ | $\bar{x}_2 = 82.4$ |
| $s_1 = 7.30$ | $s_2 = 6.74$ |
| $n_1 = 11$ | $n_2 = 10$ |

**Calculate the pooled standard deviation. Assume normal populations and equal population variances.**

- 3.22
- 14.84
- 10.69
- 7.04

8. [Hint] **A company tracks satisfaction scores based on customer feedback from individual stores on a scale of 0-100. The following data represents the customer scores from Store #1 and #2.**

| | |
|---|---|
| $\bar{x}_1 = 88.3$ | $\bar{x}_2 = 82.4$ |
| $s_1 = 7.30$ | $s_2 = 6.74$ |
| $n_1 = 11$ | $n_2 = 10$ |

**Calculate the t-test statistic with a hypothesized population difference equal to zero. Assume normal populations and equal population variances.**

- 1.92
- 1.64
- 2.33
- 2.57

**9.** **A set of paired samples is given below. Find the Sample Standard Deviation for Paired Differences rounded to 2 decimal places.**

[Hint]

| | Trial 1 | Trial 2 |
|---|---|---|
| 1 | 157 | 143 |
| 2 | 91 | 98 |
| 3 | 177 | 183 |
| 4 | 216 | 190 |
| 5 | 188 | 163 |
| 6 | 157 | 151 |
| 7 | 138 | 140 |
| 8 | 229 | 199 |
| 9 | 207 | 231 |
| 10 | 148 | 157 |

- 16.232
- 17.024
- 17.944
- 19.033

**10.** **A set of paired samples is given below. Find the 95% confidence interval for the difference of means.**

[Hint]

| | Trial 1 | Trial 2 |
|---|---|---|
| 1 | 157 | 143 |
| 2 | 91 | 98 |
| 3 | 177 | 183 |
| 4 | 216 | 190 |
| 5 | 188 | 163 |
| 6 | 157 | 151 |
| 7 | 138 | 140 |
| 8 | 229 | 199 |
| 9 | 207 | 231 |
| 10 | 148 | 157 |

- -13.166 to 23.766
- -7.537 to 18.137
- -1.845 to 12.445
- 3.816 to 6.784