ALFRED HENDRIK ACEVEDA

BSIS 3A

QUAMET

GROUP 2: **EXAM INDEPENDENT T-TES**

**TEST 1**

1. B
2. B
3. B
4. C

**TEST 2**

1. SIGNIFICANTLY
2. DIRECTION
3. SIGNIFICANT

**TEST 3**

1. E
2. A
3. B
4. C
5. D

**TEST 4**

1. t = (M₁ - M₂) / √[(s₁²/n₁) + (s₂²/n₂)]

**TEST 5**

1. We have two groups of students:

* **Group 1 (Technique A):** 75, 78, 80, 85, 77, 81, 79, 83, 76, 84, 82, 88, 79, 81, 80, 77, 86, 85, 78, 81
* **Group 2 (Technique B):** 72, 75, 80, 82, 76, 84, 79, 85, 81, 83, 77, 86, 84, 89, 82, 80, 88, 87, 79, 83

**Steps to Perform the t-test:**

1. **Calculate the sample means and standard deviations for both groups:**
   * **Group 1 (Technique A):**
     + Mean (M₁) = 80.1
     + Standard Deviation (s₁) = 3.4
   * **Group 2 (Technique B):**
     + Mean (M₂) = 81.2
     + Standard Deviation (s₂) = 4.2
2. **Calculate the pooled standard deviation (sp):**
   * **sp = √[((n₁-1)s₁² + (n₂-1)s₂²) / (n₁+n₂-2)]**
   * **sp = √[((20-1)3.4² + (20-1)4.2²) / (20+20-2)]**
   * **sp ≈ 3.8**
3. **Calculate the t-statistic:**
   * **t = (M₁ - M₂) / (sp \* √(1/n₁ + 1/n₂))**
   * **t = (80.1 - 81.2) / (3.8 \* √(1/20 + 1/20))**
   * **t ≈ -0.79**
4. **Determine the degrees of freedom (df):**
   * **df = n₁ + n₂ - 2 = 20 + 20 - 2 = 38**
5. **Find the p-value:**
   * Using a t-distribution table or statistical software, we can find the p-value associated with a t-statistic of -0.79 and 38 degrees of freedom.

**Interpretation:**

Once we calculate the p-value, we can compare it to the significance level (usually 0.05). If the p-value is greater than 0.05, we fail to reject the null hypothesis. This means there is not enough evidence to conclude that there is a significant difference in the mean exam scores between the two study techniques.

2. **Scenario:**

A fitness coach wants to compare the effectiveness of two exercise programs (Program A and Program B) in promoting weight loss over eight weeks. Participants were randomly assigned to each program, and their weight losses (in pounds) were recorded.

**Data:**

**Group 1 (Program A):** 3.8, 4.2, 4.5, 4.9, 4.1, 4.3, 4.6, 5.0, 4.7, 4.4, 4.8, 4.5, 4.9, 5.1, 4.2, 4.6, 4.3, 5.0, 4.7, 4.8

**Group 2 (Program B):** 5.5, 5.9, 5.7, 6.0, 5.6, 5.8, 6.1, 6.0, 5.9, 6.3, 5.8, 5.7, 6.4, 5.9, 6.2, 6.0, 6.1, 6.3, 5.8

**Hypothesis Testing:**

To determine if there's a significant difference in weight loss between the two programs, we can conduct an independent t-test.

**Null Hypothesis (H₀):** There is no significant difference in the mean weight loss between the two programs.

**Alternative Hypothesis (H₁):** There is a significant difference in the mean weight loss between the two programs.

**Steps to Perform the t-test:**

1. **Calculate the sample means and standard deviations for both groups:**
   * **Group 1 (Program A):**
     + Mean (M₁) = 4.6
     + Standard Deviation (s₁) = 0.35
   * **Group 2 (Program B):**
     + Mean (M₂) = 5.95
     + Standard Deviation (s₂) = 0.37
2. **Calculate the pooled standard deviation (sp):**
   * **sp = √[((n₁-1)s₁² + (n₂-1)s₂²) / (n₁+n₂-2)]**
   * **sp = √[((20-1)0.35² + (20-1)0.37²) / (20+20-2)]**
   * **sp ≈ 0.36**
3. **Calculate the t-statistic:**
   * **t = (M₁ - M₂) / (sp \* √(1/n₁ + 1/n₂))**
   * **t = (4.6 - 5.95) / (0.36 \* √(1/20 + 1/20))**
   * **t ≈ -7.64**
4. **Determine the degrees of freedom (df):**
   * **df = n₁ + n₂ - 2 = 20 + 20 - 2 = 38**
5. **Find the p-value:**
   * Using a t-distribution table or statistical software, we can find the p-value associated with a t-statistic of 1 -7.64 and 38 degrees of freedom.

**Interpretation:**

Once we calculate the p-value, we can compare it to the significance level (usually 0.05). If the p-value is less than 0.05, we reject the null hypothesis. In this case, the p-value will be very small, indicating strong evidence against the null hypothesis. We can conclude that there is a significant difference in the mean weight loss between the two exercise programs.