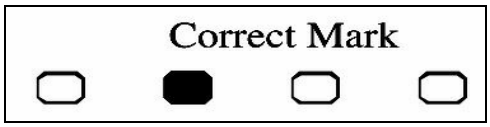
Instructor: Prof. Murdock
Duration: 50 minutes. You must stay in the test room the entire time.
Format: 18 multiple-choice questions with answers recorded on SCANTRON form. Total possible points are 90.
Allowed aids: A non-programmable calculator (and attached aid sheets, which you may detach)

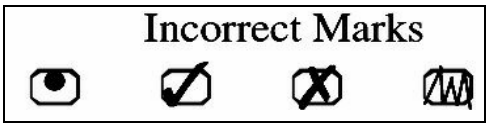
INSTRUCTIONS:
Do NOT write your answers on these test papers; You MAY do scratch work on these pages
ONLY those answers correctly marked on the SCANTRON form can earn positive marks

Correct answers are worth: **+ 5.00 points**
Incorrect answers are worth: **0 points**

- Use only a pencil or blue or black ball point pen

- **Pencil strongly recommended**, it can be erased if a mistake is made
- Make dark solid marks that fill the bubble completely





- Select the one best alternative
- Erase completely any marks you want to change
  - Crossing out a marked box is not acceptable and is incorrect

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1st : Print your **LAST NAME** and **INITIALS** in boxes provided
- Use exact name you are officially registered under
- Darken each letter in the corresponding bracket below each box

2nd : Print your 9 digit **STUDENT NUMBER** in the boxes provided
- Fill in zeros in front of the number if less than 9 digits
- Darken each number in the corresponding bracket below each box

3rd : Print 2 digit **FORM** number in the boxes provided
- Your FORM number is **02**
- Darken each number in the corresponding bracket below each box

4th : Sign your name in the **SIGNATURE** box

For the 18 questions mark your best answer on the SCANTRON form.

(1) Sampling distributions are NOT necessary for _____?

(A) statistical inference
(B) descriptive statistics
(C) confidence interval estimation
(D) hypothesis testing using p-value approach
(E) hypothesis testing using rejection region approach

(2) If making an inference about μ with a sample size of 6, then P(-2 < t < 2) ≈ _____.

(A) 75%
(B) 85%
(C) 90%
(D) 95%
(E) 99%

(3) Which is a true statement about the null hypothesis?

(A) It is usually two-directional
(B) It is almost always rejected
(C) It can be proven true with data
(D) It is based on an unbiased point estimate
(E) It specifies a value of the unknown parameter

(4) Which p-value indicates the strongest evidence in favor of a research hypothesis?

(A) 0.01
(B) 0.05
(C) 0.90
(D) 0.95
(E) 0.99

(5) A university administrator claims: "There is too much plagiarism in our university. In cases of suspected plagiarism we will continue to give the student the benefit of the doubt, but we must have a substantial amount of doubt." Which is most consistent with this administrator's position?

(A) α = 0.01; H_0: Student is guilty
(B) α = 0.10; H_0: Student is guilty
(C) α = 0.20; H_0: Student is guilty
(D) α = 0.01; H_0: Student is innocent
(E) α = 0.10; H_0: Student is innocent

► For Questions **(6) – (8)**: A random sample is taken from a normal population. Here is the STATA summary of the variable X.

```
                            X
-------------------------------------------------------------
      Percentiles      Smallest
 1%           35             35
 5%           35             35
10%           35             42       Obs                  11
25%           42             42       Sum of Wgt.          11

50%           49                      Mean                 50
                        Largest       Std. Dev.       11.28716
75%           61             55
90%           66             61       Variance           127.4
95%           67             66       Skewness        .1956145
99%           67             67       Kurtosis         1.85549
```

(6) Rounding to the nearest whole numbers, what is the 80% confidence interval estimator of μ?

(A) (35, 66)
(B) (35, 67)
(C) (43, 57)
(D) (45, 55)
(E) (46, 54)

(7) What is the conclusion for the following hypothesis test?

H_0: $\mu = 48$
H_1: $\mu < 48$

(A) Fail to reject the null
(B) Reject the null with a p-value less than 0.010
(C) Reject the null with a p-value between 0.010 and 0.025
(D) Reject the null with a p-value between 0.025 and 0.050
(E) Reject the null with a p-value between 0.050 and 0.100

(8) If a second random sample (n = 11) is taken from the same population, what is the approximate probability that the sample mean of the second sample will be greater than or equal to 42?

(A) ≈75%
(B) ≈90%
(C) ≈93%
(D) ≈98%
(E) ≈100%

(9) If [10.2, 14.6] is the 95% CI estimator of the mean, in which case should you infer the research hypothesis is true?

(A) α = 0.05; H_0: μ = 11 and H_1: $\mu \neq 11$
(B) α = 0.05; H_0: μ = 12 and H_1: $\mu \neq 12$
(C) α = 0.10; H_0: μ = 12 and H_1: $\mu \neq 12$
(D) α = 0.05; H_0: μ = 14 and H_1: $\mu \neq 14$
(E) α = 0.10; H_0: μ = 15 and H_1: $\mu \neq 15$

► For Questions **(10) – (13)**: Suppose σ^2 = 10,000 and consider this hypothesis test:
H_0: μ = 300
H_1: μ > 300

(10) Which test statistic (un-standardized) would result in the LARGEST p-value?

(A) 100
(B) 200
(C) 300
(D) 400
(E) 500

(11) To know if there is a statistically significant difference between a sample mean of 350 and the value specified in the null hypothesis, what is the most important additional information you need?

(A) Power
(B) Sample size
(C) Tolerance (τ)
(D) Type II error (β)
(E) Significance level

(12) For n = 20, the Type II error would be the largest in which case?

(A) The true population mean is 310
(B) The true population mean is 320
(C) The true population mean is 440
(D) The true population mean is 510
(E) The true population mean is 600

(13) For α = 0.05 and n = 25, what is the un-standardized rejection region?

(A) X-bar > 306.58
(B) X-bar > 332.90
(C) X-bar > 335.37
(D) X-bar > 339.20
(E) X-bar > 464.50

► For Questions **(14) – (15)**: Using α = 0.05 and a sample of size 100, consider this hypothesis test:
H_0: p = 0.45
H_1: p > 0.45

(14) If the sample proportion is 0.52, which is the best conclusion?

(A) The population proportion is 0.45
(B) The population proportion is greater than 0.45
(C) We cannot rule out a population proportion of 0.45
(D) We are 95% confident that the population proportion is 0.45
(E) We are 95% confident that the population proportion is 0.52

(15) If the true population proportion were 0.56 what would be the probability of a Type II error?

(A) 0.20
(B) 0.24
(C) 0.28
(D) 0.32
(E) 0.36

(16) A large random sample is collected: n = 900, X-bar = 10 and s^2 = 2500. A confidence interval estimator of μ is found: (5.317, 14.683). What is the confidence level?

(A) 90%
(B) 95%
(C) 99%
(D) 99.5%
(E) 99.9%

(17) When making an inference about the difference between two population means, what is the primary benefit of assuming equal population variances?

(A) Avoiding bias
(B) Improving efficiency
(C) Avoiding inconsistency
(D) Ability to use Standard normal distribution instead of Student t
(E) Obtaining a sufficiently large sample size such that the CLT applies

(18) Which is the most plausible explanation for why a result is statistically significant but not economically significant?

(A) The sample size is very large
(B) The sample size is very small
(C) The statistical test is not powerful
(D) The chosen significance level is lower than the conventional level
(E) The chosen significance level is higher than the conventional level