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KUMASI
COLLEGE OF SCIENCE
FACULTY OF PHYSICAL AND COMPUTATIONAL SCIENCES
DEPARTMENT OF STATISTICS AND ACTUARIAL SCIENCE
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BA (SOCIOLOGY AND SOCIAL WORKS)
YEAR 1**

MATH 154: STATISTICAL METHODS II

MAY, 2020

DUE 4TH JUNE, 2020

INSTRUCTIONS

Answer ALL questions, write your Index number, and submit a scanned copy in pdf.

1. When a researcher selects all possible pairs of samples from a population in order to find the difference between the means of each pair, what will be the shape of the distribution of the differences when the original distributions are normally distributed? What will be the mean of the distribution? What will be the standard deviation of the distribution?
2. A tax collector wishes to see if the variances of the values of the tax-exempt properties are different for two large cities. The values of the tax-exempt properties for two samples are shown. The data are given in millions of cedis. At $\alpha = 0.05$, is there enough evidence to support the tax collector's claim that the variances are different?

City A				City B			
113	22	14	8	82	11	5	15
25	23	23	30	295	50	12	9
44	11	19	7	12	68	81	2
31	19	5	2	20	16	4	5

3. A survey found that 83% of the men questioned preferred computer-assisted instruction to lecture and 75% of the women preferred computer-assisted instruction to lecture. There were 100 individuals in each sample. At $\alpha = 0.05$, test the claim that there is no difference in the proportion of men and the proportion of women who favor computer-assisted instruction over lecture. Find the 95% confidence interval for the difference of the two proportions.
4. A sample of non-English majors at a selected college was used in a study to see if the student retained more from reading a 19th-century novel or by watching it in DVD form. Each student was assigned one novel to read and a different one to watch, and then they

were given a 20-point written quiz on each novel. The test results are shown below. At $\alpha = 0.05$, can it be concluded that the book scores are higher than the DVD scores?

Book	90	80	90	75	80	90	84
DVD	85	72	80	80	70	75	80

5. A real estate agent wishes to determine whether tax assessors and real estate appraisers agree on the values of homes. A random sample of the two groups appraised 10 homes. The data are shown here. Is there a significant difference in the values of the homes for each group? Let $\alpha = 0.10$. Find the 90% confidence interval for the difference of the means.

Real estate appraisers	Tax assessors
$\bar{X}_1 = \$83,256$	$\bar{X}_2 = \$88,354$
$s_1 = \$3256$	$s_2 = \$2341$
$n_1 = 10$	$n_2 = 10$

6. The dean of students wants to see whether there is a significant difference in ages of resident students and commuting students. She selects a sample of 50 students from each group. The ages are shown here. At $\alpha = 0.10$, decide if there is enough evidence to reject the claim of no difference in the ages of the two groups. Use the standard deviations from the samples and the P-value method. Assume $\sigma_1 = 3.68$ and $\sigma_2 = 4.7$.

Resident students							
22	25	27	23	26	28	26	24
25	20	26	24	27	26	18	19
18	30	26	18	18	19	32	23
19	19	18	29	19	22	18	22
26	19	19	21	23	18	20	18
22	21	19	21	21	22	18	20
19	23						
Commuter students							
18	20	19	18	22	25	24	35
23	18	23	22	28	25	20	24
26	30	22	22	22	21	18	20
19	26	35	19	19	18	19	32
29	23	21	19	36	27	27	20
20	21	18	19	23	20	19	19
20	25						

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