EPPS 2302 : QUIZ #4

To get full credit for your answer, you must show your work. Use the space provided on this sheet to show your work.

Problem 1(20pt)

1 A medical researcher wishes to try three different techniques to lower cholesterol levels of patients with high cholesterol levels. The subjects are randomly selected and assigned to one of three groups. Group 1 is given medication, Group 2 is given an exercise program, and Group 3 is assigned a diet program. At the end of six weeks, each subject's cholesterol level is recorded. Find the critical value for F-score to test the hypothesis that there is no difference among the means. Use $\alpha = 0.05$.

Group 1	Group 2	Group 3
9	8	6
12	2	12
11	3	4
15	5	4
13	4	9
8	0	8

$F_{crit}(2, 15)$: 3.6823

2 Find the most appropriate critical F value to test the hypothesis that the populations have the same mean.

Group1	Group2	Group3
$n_1 = 15$	$n_2 = 16$	$n_3 = 7$
$\bar{x}_1 = 3$	$\bar{x}_2 = 4$	$\bar{x}_3 = 5$
s_1=0.5	s_2=0.2	s_3=0.8

$F_{crit}(2, 35)$, but there is no 35 in the F-table. $F_{crit}(2, 30)$= 3.3158. This is a conservative way.

Problem 2(30pt)

Test the hypothesis that the populations have the same mean. $\bar{x} = 2.7$
You need to show correct H0, H1, your decision, and interpretation.

Brand 1	Brand 2	Brand 3
$n_1 = 8$	$n_2 = 8$	$n_3 = 8$
$\bar{x}1 = 3.0$	$\bar{x}2 = 2.6$	$\bar{x}3 = 2.6$
$s_1 = 0.50$	$s_2 = 0.60$	$s_3 = 0.55$

H0 : $\mu_1 = \mu_2 = \mu_3$

H1 : At least one of the means is different.
F test score : MSB = $\frac{8(3-2.7)^2+8(2.6-2.7)^2+8(2.6-2.7)^2}{2} = 0.44$, MSW = $\frac{7(0.5^2)+7(0.6^2)+7(0.55^2)}{21} = 0.304$
F = $\frac{0.44}{0.304} = 1.447$
$F_{crit}(2, 21)$: 3.4668
Fail to reject
There is insufficient evidence at the $\alpha = 0.05$ level of significance to conclude that at least one of the means is different.

Problem 3(25pt)

Find Pearson's r

3-1)

X	Y
2	5
5	5
7	5
11	5
19	5
23	5

r = 0

3-2)

X	Y
0	2
0	3
3	5
5	5
7	8
9	10

$\bar{x} = 4, \bar{y} = 5.5$
SP = 54, SSx = 68, SSy = 45.5
r=$\frac{54}{\sqrt{68*45.5}}$ = 0.97

Problem 4(25pt)

Use data for the Problem 3-2).
Find the regression line equation for it.
In addition, find R^2 and interpret it.
s_x = 3.69, s_y=3.02

$b_1 = 0.97 * \frac{3.02}{3.69}$ or $\frac{54}{68} = 0.79$
$b_0 = 5.5 - 0.79 * 4 = 2.34$
$\hat{y} = 0.79x + 2.34$
$R^2 = r^2 = 0.94$.
94% of the variability in Y explained by the least-squares regression line.