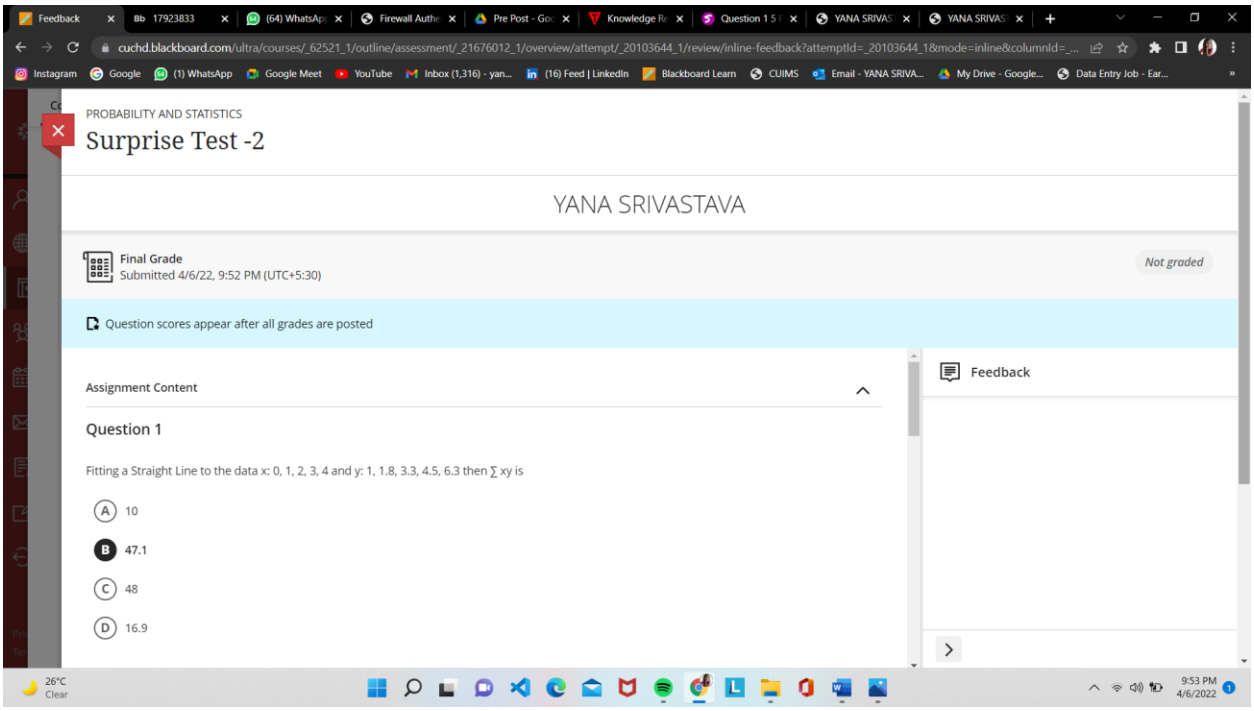
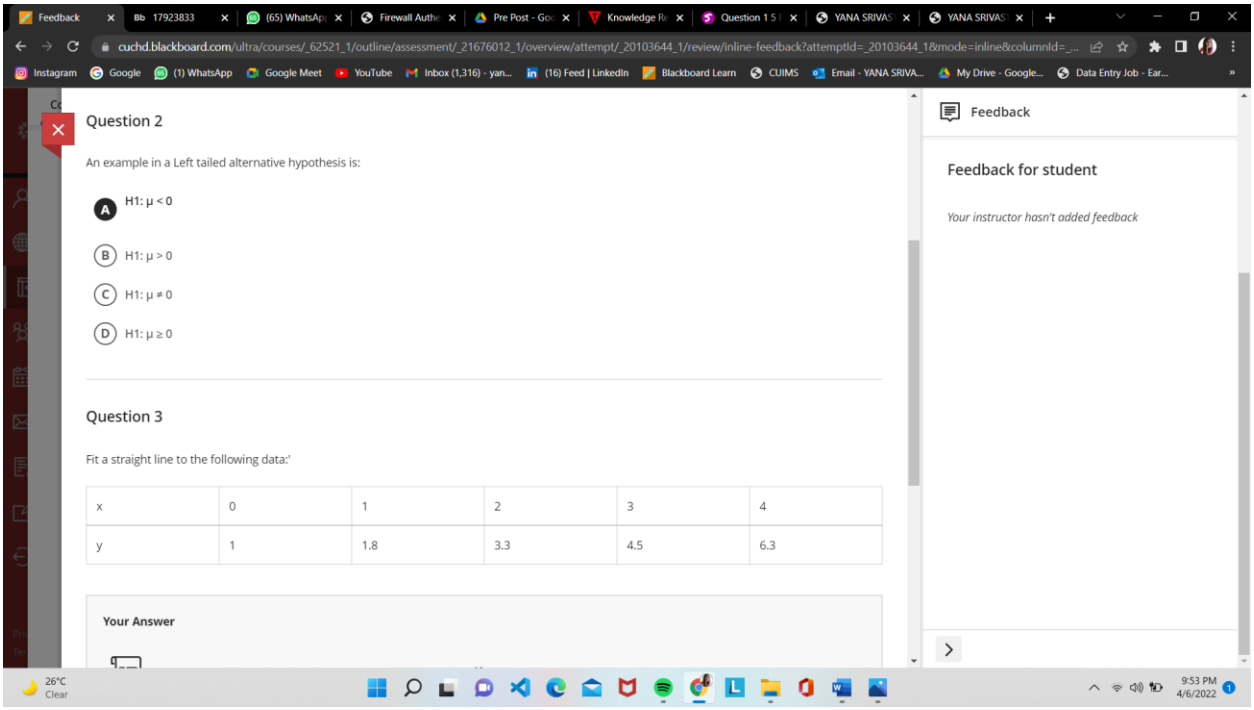

PROBABILITY AND STATISTICS
Surprise Test -2
YANA SRIVASTAVA
Final Grade
Submitted 4/6/22, 9:52 PM (UTC+5:30)
Not graded
Question scores appear after all grades are posted
Assignment Content
Feedback
Question 1
Fitting a Straight Line to the data x: 0, 1, 2, 3, 4 and y: 1, 1.8, 3.3, 4.5, 6.3 then ∑ xy is
A 10
B 47.1
C 48
D 16.9


Question 2
An example in a Left tailed alternative hypothesis is:
A H1: μ < 0
B H1: μ > 0
C H1: μ ≠ 0
D H1: μ ≥ 0
Feedback
Feedback for student
Your instructor hasn't added feedback
Question 3
Fit a straight line to the following data:'
x 0 1 2 3 4
y 1 1.8 3.3 4.5 6.3
Your Answer

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Fit a straight line to the following data -

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

Sol: Let the straight line is $y = a + bx$ — (I)

Normal equations are —

$\Sigma y = \Sigma a + \Sigma bx$

$\Sigma y = a\Sigma 1 + b\Sigma x$

$\Sigma y = na + b\Sigma x$

$\Sigma y = \bar{5}a + b\Sigma x$ — (II)

After multiplying both sides by x -

$\Sigma xy = a\Sigma x + b\Sigma x^2$ — (III)

x	y	xy	x^2
0	1	0	0
1	1.8	1.8	1
2	3.3	6.6	4
3	4.5	13.5	9
4	6.3	25.2	16
$\Sigma x = 10$	$\Sigma y = 16.9$	$\Sigma xy = 47.1$	$\Sigma x^2 = 30$

Here, $n = 5$, $\Sigma x = 10$, $\Sigma y = 16.9$, $\Sigma xy = 47.1$ and $\Sigma x^2 = 30$

Putting these values in normal eq^{n}s, we get -

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$16.9 = 5a + 10b$ — (IV)

$47.1 = 10a + 30b$ — (V)

Eqn (V) − 2 × Eqn (IV)

$10a + 30b = 47.1$

$10a + 20b = 33.8$

$10b = 13.3$

$b = 1.33$

On putting the value of b in eqn (IV) −

$5a + 10(1.33) = 16.9$

$5a + 13.3 = 16.9$

$5a = 3.6$

$a = 0.72$

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The average income of persons was Rs. 210 with a S.D. of Rs. 10 in sample of 100 people of a city. For another sample of 150 persons, the average income was Rs. 220 with S.D. of Rs. 12. The S.D. of incomes of the people of the city was Rs. 11. Test whether there is any significant difference the average income of the localities.

Sol. $H_0 = \bar{x}_1 = \bar{x}_2$

$H_1 = \bar{x}_1 \neq \bar{x}_2$

Level of Significance, $\alpha = 0.05$

Critical Region accept null hypothesis if $-1.96 < Z < 1.96$

$\bar{x}_1 = 210 \quad S_1 = 10 \quad x_1 = 100$

$\bar{x}_2 = 220 \quad S_2 = 12 \quad x_2 = 150$

$$Z = \left| \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \right| = \left| \frac{210 - 220}{\sqrt{\frac{100}{100} + \frac{144}{150}}} \right|$$

$$= \left| \frac{-10}{\sqrt{1.96}} \right| = \left| \frac{-10}{1.4} \right|$$

$$= 7.1428$$

$\Rightarrow H_0$ is rejected.