Assignment 3: Regression

Use the following data to determine if there is a relationship between anxiety and alcohol consumption.

Participants	Anxiety (higher scores = more anxiety)	Alcohol Consumption (drinks/day)
1	1	0
2	5	1
3	9	3
4	6	3
5	8	10
6	5	0
7	2	0
8	10	5
9	2	2
10	7	3

SPSS Instructions

- On the bottom left, click Variable View
- Enter Anxiety in the first cell.
- Enter Alcohol in the cell below it.
- Click on the first cell under 'Measure' and change it to 'Scale'. Do this for the cell below it too.
- On the bottom left, click Data View.
- Enter the Anxiety Rating scores in the first column.
- Enter the Alcohol Consumption scores in the second column.
- Click Analyze, Descriptive Statistics, Descriptives.
- Move the Anxiety and Alcohol icons over to the Variables box.
- Click OK.
- Click Analyze, Regression, Linear.
- Move the Alcohol icon over to the Dependent box, and move the Anxiety icon over to the Independent(s) box.
- Click OK.
- Click Graphs, Chart Builder
- Near the bottom left, select Scatter/Dot. Drag the top left scatter/dot icon to the window above.
- Near the top left, drag the Anxiety icon to the x axis on the graph, and drag the Alcohol icon to the y axis on the graph.
- Click OK.
- On the Output file, double-click on the scatterplot. A new window should appear.
- Click Elements, and then select 'Fit Line at Total'.
- Another window will appear. Unselect 'Linear' and then reselect 'Linear' so you can click Apply.
- Close the two boxes (but not the Output file).
- Save the Data file and Output file separately. Use informative file names.

SPSS Data

	Anxiety	Alcohol	var
1	1.00	.00	
2	5.00	1.00	
3	9.00	3.00	
4	6.00	3.00	
5	8.00	10.00	
6	5.00	.00	
7	2.00	.00	
8	10.00	5.00	
9	2.00	2.00	
10	7.00	3.00	
11			
12			

SPSS Output

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Anxiety	10	1.00	10.00	5.5000	3.10018
Alcohol	10	.00	10.00	2.7000	3.05687
Valid N (listwise)	10				

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.662[a]	.439	.369	2.42887

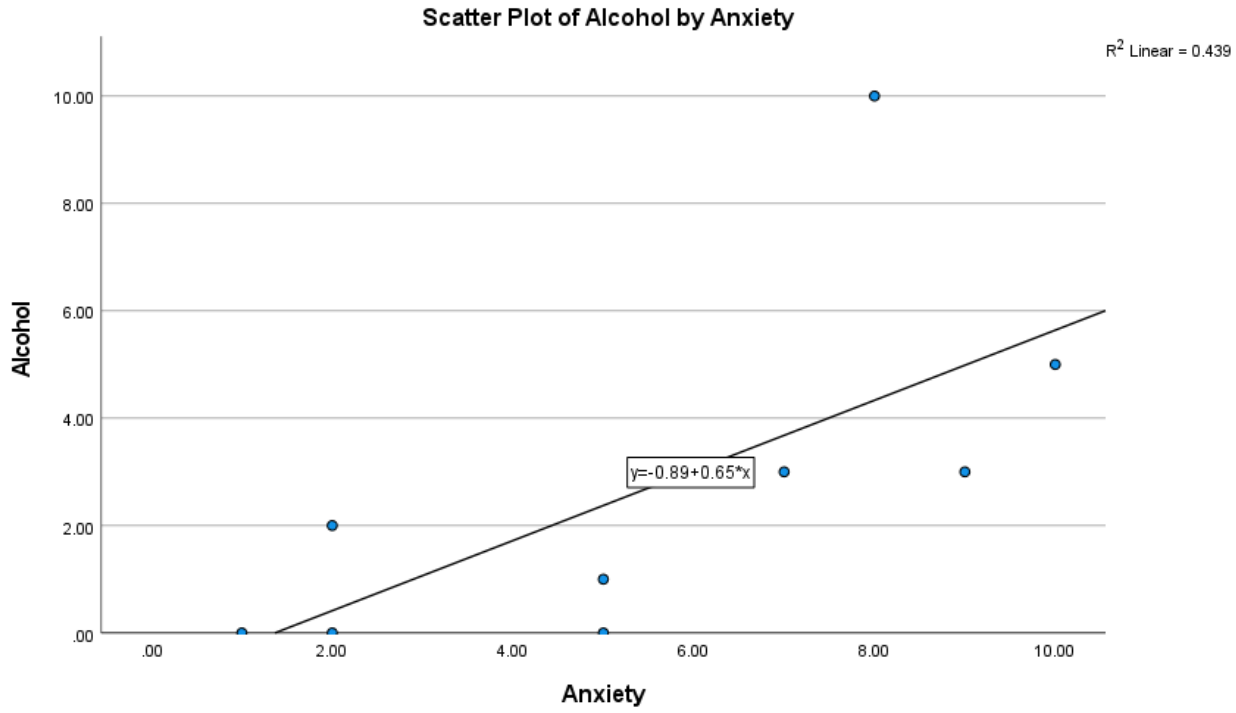
a. Predictors: (Constant), Anxiety

Coefficients[a]

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.

		B	Std. Error	Beta		
1	(Constant)	-.892	1.629		-.548	.599
	Anxiety	.653	.261	.662	2.501	.037

a. Dependent Variable: Alcohol



Written Answers

Show all work.

(1) Calculate the regression equation by hand. You don't need to calculate the means and standard deviations—you may use those from the SPSS Output.

$$\hat{y} = bx + a$$

$$b = r\frac{s_y}{s_x} \qquad b = .662 * (3.06/3.10) = .653$$

$$a = \bar{y} - b\bar{x} \qquad a = 2.7 - .653 * 5.5 = -.892$$

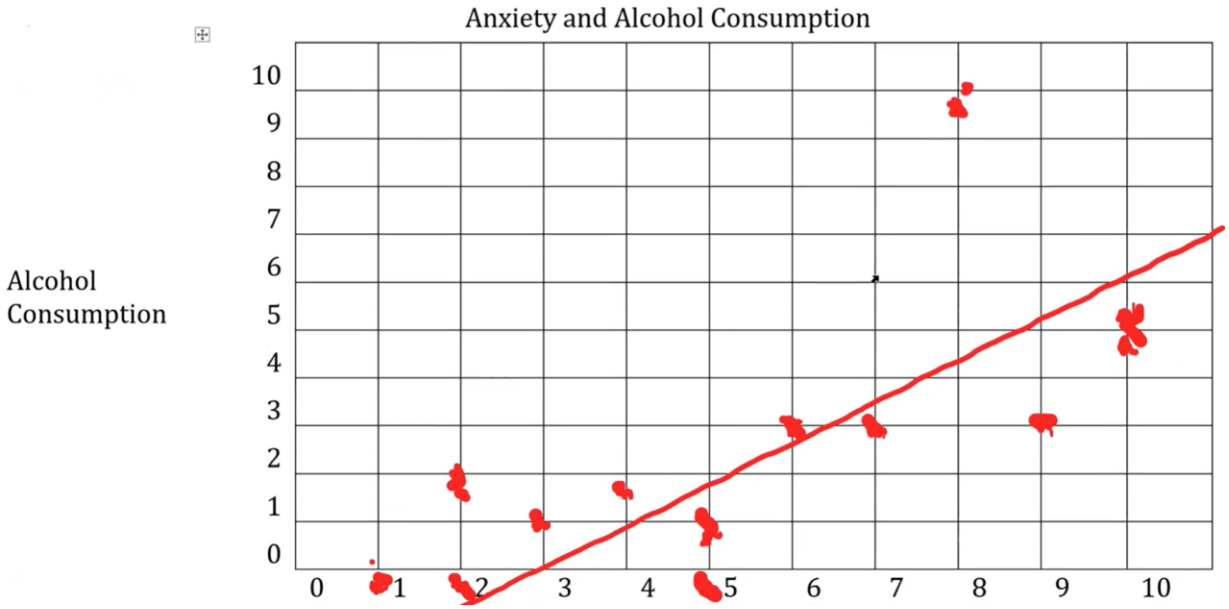
$$\hat{y} = .653x - .892$$

(2) Calculate the 3 values for $\hat{y}$ when Anxiety Ratings = 3, 4, and 10.

$\hat{y} = .653 * 3 - .892 = 1.07$
$\hat{y} = .653 * 4 - .892 = 1.72$
$\hat{y} = .653 * 10 - .892 = 5.64$

x	$\hat{y}$
3	1.07
4	1.72
10	5.64

(3) Plot the 10 data points from the table above and the 3 data points from Question 2. Draw the regression line.



(4) On the SPSS Output "Model Summary" table, what is the value for r^2 and what does it mean?
(5) From that same table, what is the value for the standard error of the estimate and what does it mean?
(6) Write down the regression equation, then write down the unstandardized coefficients located under "B" on the "Coefficients[a]" table on the SPSS Output. The purpose is for you to see where the regression equation comes from on the SPSS Output.

4.) $r^2 = .439$. This means that 43.9% of the variance in alcohol consumption is related to anxiety
5.)
The standard error of the estimate is 2.43. This means that the average vertical distance from the regression line is 2.43 drinks.

(6) $\hat{y} = .653x - .892$
Unstandardized coefficients: Constant = -.892; Anxiety = .653