Participant	X	Y	$\hat{y}$
1	9	2	2.500
2	7	5	3.786
3	5	4	5.071
4	1	7	7.643
5	2	8	7.000
Mean	4.8	5.2	
SD	3.347	2.387	

For 5 participants, their scores on a predictor (X) and dependent variable (Y) were registered. The correlation between X and Y = -0.901. Use these values for the following questions:

1) Calculate the slope of the corresponding regression model, in which X predicts Y

2) Calculate the intercept of the corresponding regression model

3) Calculate the two-sided p-value of the slope. It's true that you don't have the standard error of the slope, so you'll have to use a different t-formula that will get you the same answer in this situation.

4) Calculate the 95% confidence interval around the correlation

5) Calculate the standardized slope of the corresponding regression model, in which X predicts Y

6) Calculate R, the correlation between the model and the dependent variable

7) Calculate R^2, the multiple correlation coefficient or coefficient of determination

8) Calculate R^2W, the Adjusted R^2

9) Fill in the entire ANOVA table below. You are given all observed values (Y), predicted values (y^), and the mean of y in the table. This should allow you to be able to calculate all sums of squares. N and number of predictors are also known, which should give all degrees of freedom.

Effect	**SS**	**DF**	**MS**	**F**
Model				
Error (Residual)				
Total				

10) Why is the F-value in the ANOVA table in question 9 equal to the square of the t-value that you calculated for question 3? Is this always true for simple linear regression?

A multiple regression was computed where "Speed" and "Hand-Eye coordination" were used to predict "Gaming skill". N = 50. Use the following correlation table for questions 11 – 20.

Correlation	Speed	HandEye	Skill
Speed	1	0.2	0.4
HandEye	0.2	1	0.6
Skill	0.4	0.6	1

11) Calculate the standardized slope (b*) for Hand eye coordination

12) Calculate the partial correlation (pr) for Hand eye coordination

13) Calculate the semi-partial explained variance (sr^2) for Speed

14) Calculate the R^2 for the model as a whole

15) Calculate R^2Stein for the model

16) Calculate the semi-partial correlation for Hand eye coordination

Additional information: The standard deviation for Speed = 3, The standard deviation for Hand Eye coordination = 2, The standard deviation for Skill = 6

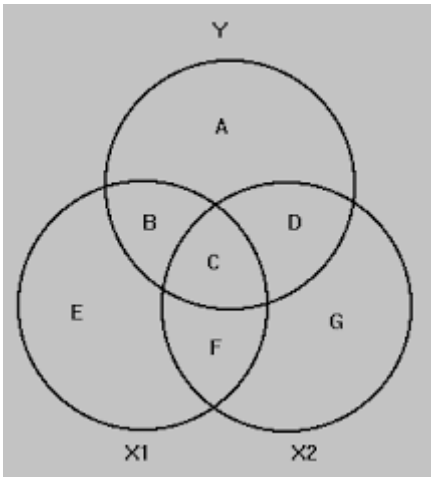
17) Calculate the unstandardized slope (b) for Hand eye coordination. Tip: the value you calculated for question 11 can help you here

18) Assume that the standard error of the slope you just calculated is 1. Calculate the two-sided p-value of this slope

19) Calculate the 95% confidence interval for this slope

20) Now that you have so much information on the relationship between Hand-eye coordination and gaming skill, how would you interpret this slope? What does the slope itself mean? Is it significant? What is the effect size? How would you describe the effect size?

Now, some ballentine puzzles. Since there are different ballentines out there, I will use the picture below for reference. Note that this ballentine shows explained variance, so for example, if you calculate sr with the formula of the formula sheet, never forget to square it.



Correlation	X1	X2	Y
X1	1	0.2	-0.4
X2	0.2	1	0.4
Y	-0.4	0.4	1

21) What is the explained variance of X1 in Y, without partialing out X2 from either X1 or Y?

22) What is the explained variance of X2 in Y, when X1 is partialed out of both X1 and Y?

23) Calculate the area "C"

24) Calculate the area “C + F”

25) Calculate the area “A”. What does this stand for?

26) What is the difference between partial and semi-partial correlation of X1?

A) Partial correlation removes overlap with X2 from both X1 and Y. Semi-partial correlation only removes overlap with Y
B) Partial correlation removes overlap with X2 from both X1 and Y. Semi-partial correlation only removes overlap with X1
C) Partial correlation removes overlap with X2 from X1. Semi-partial correlation only removes overlap with Y
D) Partial correlation removes overlap with X2 from Y. Semi-partial correlation only removes overlap with X1

27) Which of the following purely corrects R^2 for inflation due to number of predictors

A) Stein correction
B) Wherry correction
C) Both
D) Neither

28) Which value is the most appropriate for comparing unique contributions from predictors in explaining the variance of the dependent variable?

A) Semi-partial explained variance
B) Partial explained variance
C) R^2
D) Adjusted R^2

29) Which type of interval has the largest width?

A) Confidence interval for the slope
B) Confidence interval for mean response
C) Prediction interval
D) That differs for different samples

30) For simple linear regression, what is always true?

A) $pr^2 > sr^2$

B) $pr^2 < sr^2$

C) $pr^2 = sr^2$

D) That differs for different samples