Below is a data set from a "mental rotation" experiment. Specifically, subjects are told to identify, as quickly as possible, whether 2 stimuli that are presented side by side are identical except for orientation. The experimenter varies the orientation between the two stimuli (α) and times the subjects response (RT, measured in milliseconds) . The orientation difference is measured in angular degrees (see Figure 1). The experimenter hypothesizes that that as the angle between the objects increases, the subjects RT should increase. Is this true?
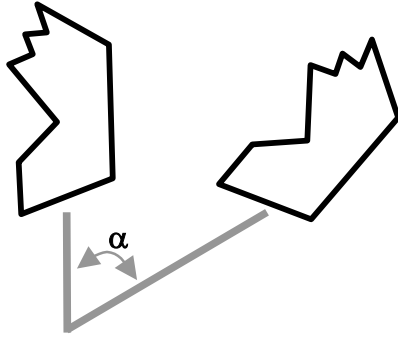

Figure 1: The two stimuli are displaced by α degrees. The larger a, the larger angular disparity between the objects.

	α	RT	(X-Xmean)(Y-Ymean)
	66	1280	-1197
	106	1323	1900
	32	1105	6490
	154	1085	-9246
	18	622	41469
	38	833	19110
	52	728	17325
	12	871	26400
	54	1432	-6897
	110	1788	12995
	82	803	2100
	90	1416	579
	160	1729	36938
	108	1251	588
	108	1665	9282
	30	735	27816
	178	1449	20566
	166	1904	53799
Sum	1564	22019	260017
Mean	87	1223	14445
Median	86	1265.5	11138.5
SD	53	399	17526
N	18	18	18

Please calculate the following:

1. Covariance between Angle and RT.
2. Correlation between Angle and RT.
3. The adjusted correlation between Angle and RT.
4. The intercept for the regression equation Angle and RT.
5. The slope for the regression equation Angle and RT.
6. The percent of variance accounted for by the regression equation.
7. Is the correlation significantly different from zero (show work).
8. What is the power of your test of the correlation?
9. What are the 95% confidence limits for the slope?
10. Does the data confirm the experimenters hypothesis?

Essays (Must do question 1. Also, pick 2 of the remaining 4):

1. Discuss the difference between prediction and explanation.
2. Please compare and contrast a regression equation and a correlation.
3. What should you look for in the data before you compute a regression equation on data.
4. Why is hard to interpret how a change in one predictor will affect the criterion in a multiple regression.
5. How are Betas and semi-partial correlations related? When looked at together, what do they tell you about the importance of each predictor variable?