



“FRAPPY” {Free Response AP Problem...Yay!}

The following problem is taken from an actual Advanced Placement Statistics Examination. Your task is to generate a complete, concise statistical response in 25 minutes. You will be graded based on the AP rubric and will earn a score of 0-4. After grading, keep this problem in your binder for your AP Exam preparation.

The statistics department at a large university is trying to determine if it is possible to predict whether an applicant will successfully complete the Ph.D. program or will leave before completing the program. The department is considering whether GPA (grade point average) in undergraduate statistics and mathematics courses (a measure of performance) and mean number of credit hours per semester (a measure of workload) would be helpful measures. To gather data, a random sample of 20 entering students from the past 5 years is taken. The data are given below.

Successfully Completed Ph.D. Program

Student	A	B	C	D	E	F	G	H	I	J	K	L	M
GPA	3.8	3.5	4.0	3.9	2.9	3.5	3.5	4.0	3.9	3.0	3.4	3.7	3.6
Credit hours	12.7	13.1	12.5	13.0	15.0	14.7	14.5	12.0	13.1	15.3	14.6	12.5	14.0

Did Not Complete Ph.D. Program

Student	N	O	P	Q	R	S	T
GPA	3.6	2.9	3.1	3.5	3.9	3.6	3.3
Credit hours	11.1	14.5	14.0	10.9	11.5	12.1	12.0

The regression output below resulted from fitting a line to the data in each group. The residual plots (not shown) indicated no unusual patterns, and the assumptions necessary for inference were judged to be reasonable.

Successfully Completed Ph.D. Program

Predictor	Coef	StDev	T	P
Constant	23.514	1.684	13.95	0.000
GPA	-2.7555	0.4668	-5.90	0.000
S = 0.5658		R-Sq = 76.0%		

Did Not Complete Ph.D. Program

Predictor	Coef	StDev	T	P
Constant	24.200	3.474	6.97	0.001
GPA	-3.485	1.013	-3.44	0.018
S = 0.8408		R-Sq = 70.3%		

Scoring:

(a) Use an appropriate graphical display to compare the GPA's for the two groups. Write a few sentences commenting on your display.

E P I

(b) For the students who successfully completed the Ph.D. program, is there a significant relationship between GPA and mean number of credit hours per semester?

Give a statistical justification to support your response.

E P I

(c) If a new applicant has a GPA of 3.5 and a mean number of credit hours per semester of 14.0, do you think this applicant will successfully complete the Ph.D. program? Give a statistical justification to support your response.

E P I

Total: __/4