



# “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 15 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.

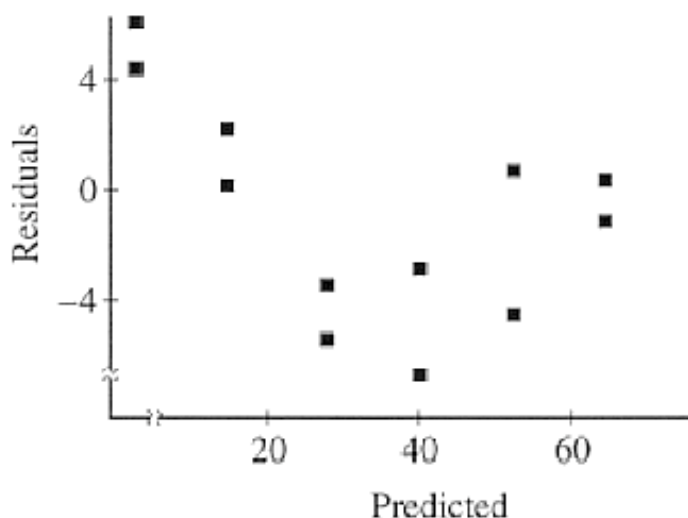
In a study of the application of a certain type of weed killer, 14 fields containing large numbers of weeds were treated. The weed killer was prepared at seven different strengths by adding 1, 1.5, 2, 2.5, 3, 3.5, or 4 teaspoons to a gallon of water. Two randomly selected fields were treated with each strength of weed killer. After a few days, the percentage of weeds killed on each field was measured. The computer output obtained from fitting a least squares regression line to the data is shown below. A plot of the residuals is provided as well.

Dependent variable is: percent killed

R squared = 97.2% R squared (adjusted) = 96.9%

$s = 4.505$  with  $14 - 2 = 12$  degrees of freedom

Source	Sum of Squares	df	Mean Square	F-ratio
Regression	8330.16	1	8330.16	410
Residual	243.589	12	20.2990	
Variable	Coefficient	s.e. of Coeff	t-ratio	Prob
Constant	-20.5893	3.242	-6.35	$\leq 0.0001$
No. Teaspoons	24.3929	1.204	20.3	$\leq 0.0001$



(a) What is the equation of the least squares regression line given by this analysis? Define any variables used in this equation.

(b) If someone uses this equation to predict the percentage of weeds killed when 2.6 teaspoons of weed killer are used, which of the following would you expect?

- The prediction will be too large.
- The prediction will be too small.
- A prediction cannot be made based on the information given on the computer output.

Explain your reasoning.

**Total: \_\_/4**