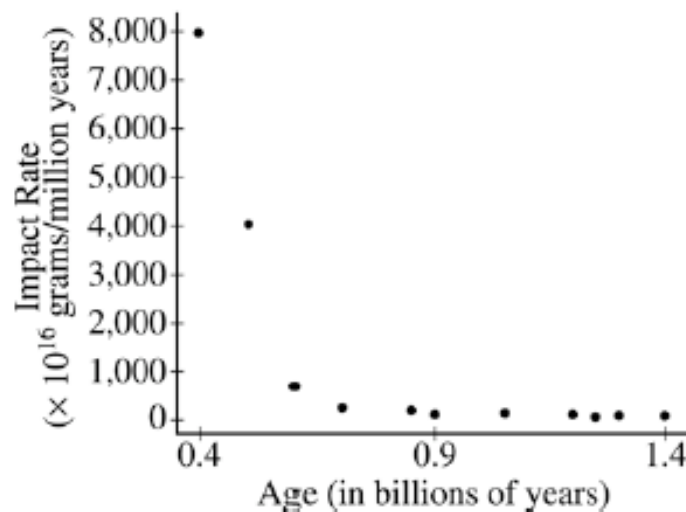




“FRAPPY” {Free Response AP Problem...Yay!}

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.

The Earth’s Moon has many impact craters that were created when the inner solar system was subjected to heavy bombardment of small celestial bodies. Scientists studied 11 impact craters on the Moon to determine whether there was any relationship between the age of the craters (based on radioactive dating of lunar rocks) and the impact rate (as deduced from the density of the craters). The data are displayed in the scatterplot below.



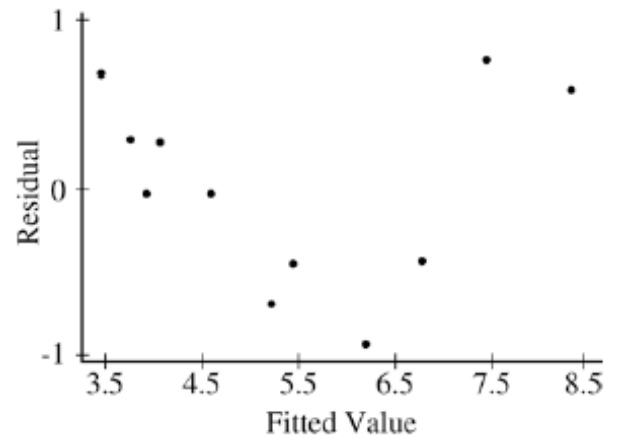
Scoring:

- (a) Describe the nature of the relationship between impact rate and age.

E P I

Prior to fitting a linear regression model, the researchers transformed both impact rate and age by using logarithms. The following computer output and residual plot were produced.

Regression Equation: $\ln(\text{rate}) = 4.82 - 3.92 \ln(\text{age})$				
Predictor	Coef	SE Coef	T	P
Constant	4.8247	0.1931	24.98	0.000
$\ln(\text{age})$	-3.9232	0.4514	-8.69	0.000
S = 0.5977		R-Sq = 89.4%		R-Sq (adj) = 88.2%



(b) Interpret the value of r^2 .

E P I

(c) Comment on the appropriateness of this linear regression for modeling the relationship between the transformed variables.

E P I

Total: __/4