AP STATISTICS
(Section 12.1)

Sarah's parents are concerned that she seems short for her age. Their doctor has recorded Sarah's age and height on six consecutive office visits. These data were entered into a Minitab worksheet and Sarah's height was regressed on her age. Here is part of the computer output.

Predictor	Coef	StDev	*t*-ratio	P
Constant	71.950	1.053	*	*
Age	0.38333	0.02041	*	*
s = 0.3873		R-sq = 98.9%		R-sq (adj) = 98.6%

1. Suppose we want to conduct a test to determine whether Sarah's age is useful in predicting her height. Define the parameter of interest; write an appropriate null and alternative hypothesis for such a test.

2. What is the equation of the least-squares regression line?

3. The t statistic for testing H_0 has been left out. Find t.

4. How many degrees of freedom does t have?

5. Use Table B or your calculator to find the P-value.

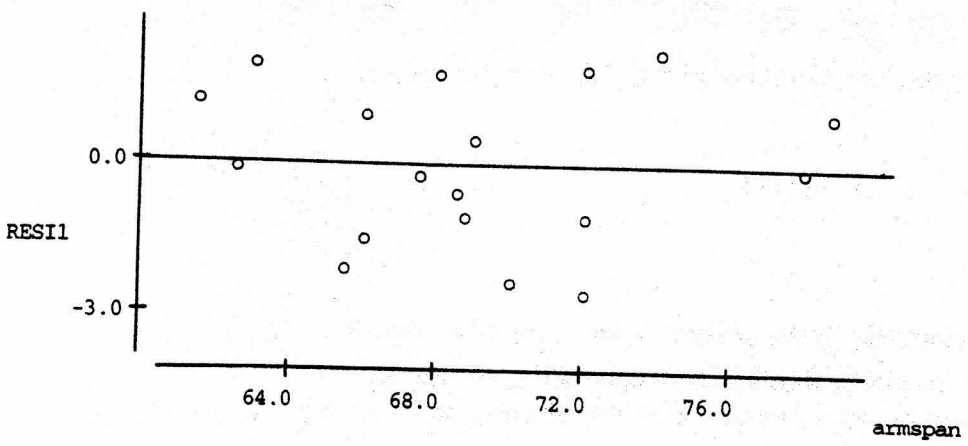
6. Write your conclusion in plain language (at $\alpha = .05$).

Ideal Proportions

Once upon a time, a random sample of students at Indiana Univerity made measurements of their arm span and height. They entered their results into a Minitab worksheet, requested least squares regression of height on arm span (both in inches) and obtained the following output:

Predictor	Coef	StDev	*t*-ratio	P
Constant	11.547	5.600	2.06	0.056
Arm Span	0.84042	0.08091	10.39	0.000
s = 1.613		R-sq = 87.1%		R-sq (adj) = 86.3%

A residual plot for the data looks like this:



1. Determine the equation of the least squares regression line.

2. Construct a 95% confidence interval for the true slope determined by arm span and height for all students at IU (use PAIS):

As part of a class project at a large university, Amber selected a random sample of 12 students in her major field of study. All students in the sample were asked to report their number of hours spent studying for the final exam and their score on the final exam. A regression analysis on the data produced the following partial computer output.

Predictor	Coef	SE Coef	T	P
Constant	62.328	4.570	13.64	0.000
Study Hours	2.697	0.745	3.62	0.005
S = 5.505	R-sq = 56.7%			

Amber wants to compute a 95 percent confidence interval for the slope of the least squares regression line in the population of all students in her major field of study. Assuming that conditions for inference are satisfied, which of the following gives the margin of error for the confidence interval?

(A) $(2.228)(0.745)$

(B) $(2.228)\left(\frac{0.745}{\sqrt{12}}\right)$

(C) $(2.228)(5.505)$

(D) $(2.228)\left(\frac{5.505}{\sqrt{12}}\right)$

(E) $(2.228)(2.697)$