

MINITAB / Computer Printouts Practice

Find the following for problems 1-8:

- a. Line of Best Fit
- b. Interpret r^2 in context
- c. Interpret the slope in context
- d. Interpret the y-intercept in context
- e. Correlation r .

1. Ms. President? The Gallup organization, over six decades, periodically asked the following question: *If your party nominated a generally well-qualified person for president who happened to be a woman, would you vote for that person?* The variables are percent saying yes and year.

Here is the regression analysis:

R-squared = 94.2%

$s = 4.274$ with $16 - 2 = 14$ degrees of freedom

Variable	Coefficient	SE(Coeff)	t-ratio	Prob
Constant	-5.58269	4.582	-1.22	0.2432
Year	0.999373	0.0661	15.1	<0.0001

2. Drug use. The *European School Study Project on Alcohol and Other Drugs*, published in 1995, investigated the use of marijuana and other drugs. Data from 11 countries are summarized in the scatterplot and regression analysis below. They show the association between the percentage of a country's ninth graders who report having smoked marijuana and who have used other drugs such as LSD, amphetamines, and cocaine.

R-squared = 87.3%

$s = 3.853$ with $11 - 2 = 9$ degrees of freedom

Variable	Coefficient	SE(Coeff)	t-ratio	Prob
Constant	-3.06780	2.204	-1.39	0.1974
Marijuana	0.615003	0.0784	7.85	0.0001

3. No opinion. Here's a regression of the percentage of respondents whose response to the question about voting for a woman president was "no opinion." We wonder if the percentage of the public who have no opinion on this issue has changed over the years. Assume that the conditions for inference are satisfied. R-squared = 9.5% $s = 2.280$ with $16 - 2 = 14$ degrees of freedom

Variable	Coefficient	SE(Coeff)	t-ratio	Prob
Constant	7.69962	2.445	3.15	0.0071
Year	-0.042708	0.0353	?	?

4. Cholesterol. Does a person's cholesterol level tend to increase with age? Data collected in Framingham, MA, from 294 adults aged 45 to 62 produced the regression analysis shown. Assuming that the data satisfy the conditions for inference, examine the association between age and cholesterol level.

Variable	Coefficient	SE(Coeff)	t-ratio	Prob
Constant	196.619	33.21	5.92	≤ 0.0001
Age	0.745779	0.6075	?	?

$R^2 = 58.3$ $s = 2.563$

5. Marriage age. The scatterplot suggests a decrease in the difference in ages at first marriage for men and women since 1975. We want to examine the regression to see if this decrease is significant.

R-squared = 46.3%

$s = 0.1866$ with $24 - 2 = 22$ degrees of freedom

Variable	Coefficient	SE(Coeff)	t-ratio	Prob
Constant	49.9021	10.93	4.56	≤ 0.0001
Year	-0.0293957	0.0055	?	?

6. Fuel economy. A consumer organization has reported test data for 50 car models. We will examine the association between the weight of the car (in thousands of pounds) and the fuel efficiency (in miles per gallon). Shown are the summary statistics, scatterplot, and regression analysis:

R-squared = 75.6%

$s = 2.413$ with $50 - 2 = 48$ df

Variable	Coefficient	SE(Coeff)	t-ratio	Prob
Constant	48.7393	1.976	24.7	≤ 0.0001
Weight	-8.21362	0.6738	-12.2	≤ 0.0001

7. SAT scores. How strong is the association between student scores on the Math and Verbal sections of the SAT? Scores on this exam range from 200 to 800, and are widely used by college admissions offices. Here are summaries and plots of the scores for a recent graduating class at Ithaca High School.

R-squared = 46.9%

$s = 71.75$ with $162 - 2 = 160$ df

Variable	Coefficient	SE(Coeff)	t-ratio	Prob
Constant	209.554	34.35	6.10	≤ 0.0001
Verbal	0.675075	0.0568	?	?

8. Cereal. A healthy cereal should be low in both calories and sodium. Data for 77 cereals were examined and judged acceptable for inference. The 77 cereals had between 50 and 160 calories per serving and between 0 and 320 mg of sodium per serving. The regression analysis is shown.

R-squared = 9.0%

$s = 80.49$ with $77 - 2 = 75$ degrees of freedom

Variable	Coefficient	SE(Coeff)	t-ratio	Prob
Constant	21.4143	51.47	0.416	0.6706
Calories	1.29357	0.4738	?	?

- a) Is there an association between the number of calories and the sodium content of cereals? Explain.
- b) Do you think this association is strong enough to be useful? Explain.