ap stat HW #21 P. 658 # 6, 10, 18, 28, 35(a-e)

Note Title 3/1/2017

6. Used cars. Classified ads in a newspaper offered several used Toyota Corollas for sale. Listed below are the ages of the cars and the advertised prices.

Age (yr)	Prices Advertised ($)
1	12,995; 10,950
2	10,495
3	10,995; 10,995
4	6,995; 7,990
5	8,700; 6,995
6	5,990; 4,995
9	3,200; 2,250; 3,995
11	2,900; 2,995
13	1,750

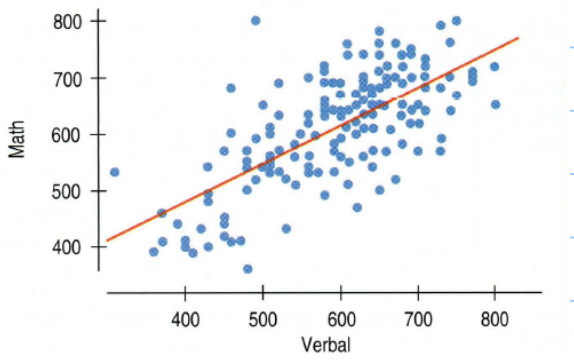
a) Make a scatterplot for these data.
b) Do you think a linear model is appropriate? Explain.
c) Find the equation of the regression line.
d) Check the residuals to see if the conditions for inference are met.

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

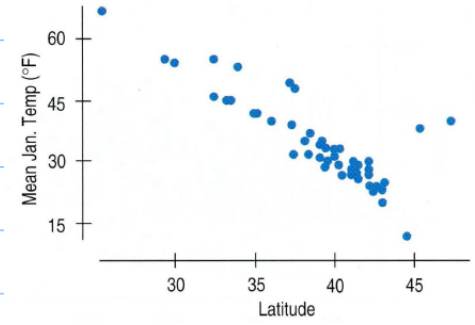
Variable	Count	Mean	Median	StdDev	Range	IntQRange
Verbal	162	596.296	610	99.5199	490	140
Math	162	612.099	630	98.1343	440	150

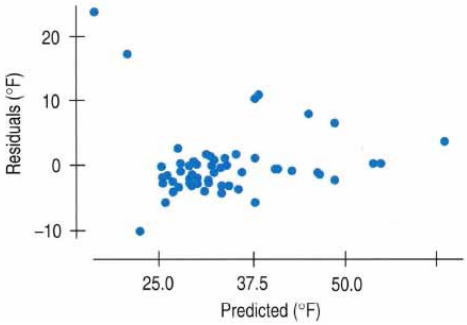
Dependent variable is: Math
R-squared = 46.9%
s = 71.75 with 162 − 2 = 160 df

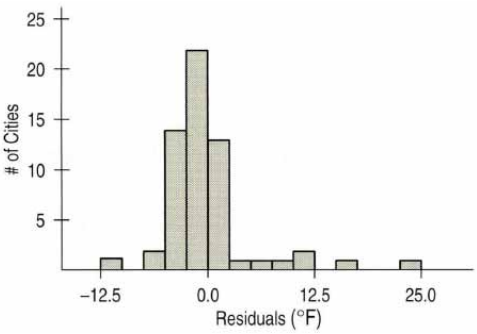
Variable	Coefficient	SE(Coeff)	t-ratio	P-value
Intercept	209.554	34.35	6.10	≤0.0001
Verbal	0.675075	0.0568	11.9	≤0.0001

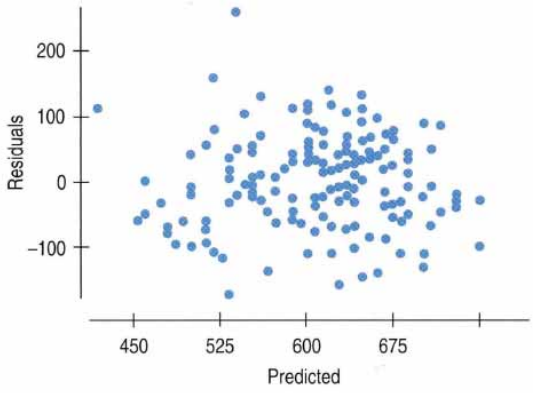


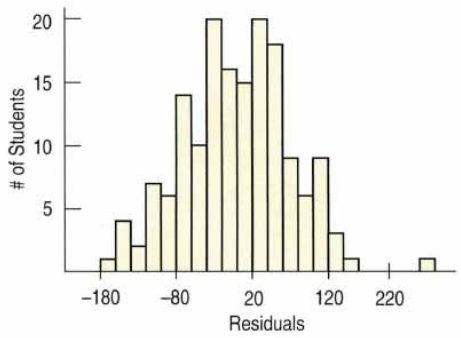
18. Winter. The output shows an attempt to model the association between average *January temperature* (in degrees Fahrenheit) and *latitude* (in degrees north of the equator) for 59 U.S. cities. Which of the assumptions for inference do you think are violated? Explain.







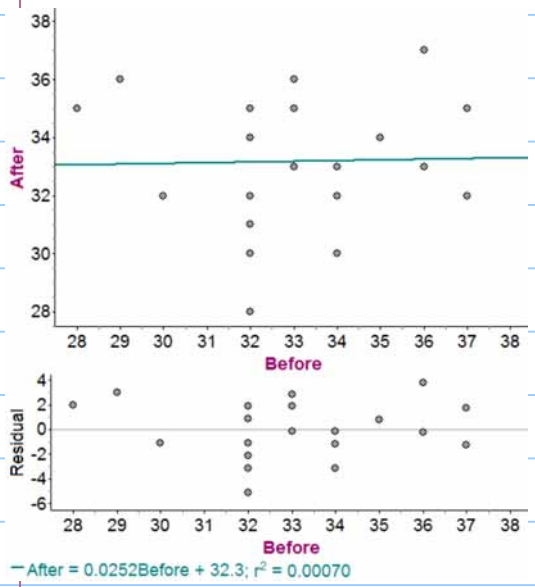




a) Is there evidence of an association between Math and Verbal scores? Write an appropriate hypothesis.
b) Discuss the assumptions for inference.
c) Test your hypothesis and state an appropriate conclusion.

28. Strike two. Remember the Little League instructional video discussed in Chapter 25? Ads claimed that the techniques would improve the performances of Little League pitchers. To test this claim, 20 Little Leaguers threw 50 pitches each, and we recorded the number of strikes. After the players participated in the training program, we repeated the test. The table shows the number of strikes each player threw before and after the training. A test of paired differences failed to show that this training was effective in improving a player's ability to throw strikes. Is there any evidence that the effectiveness of the video depends on the player's initial ability to throw strikes? Test an appropriate hypothesis and state your conclusion.

Number of Strikes (out of 50)			
Before	After	Before	After
28	35	33	33
29	36	33	35
30	32	34	32
32	28	34	30
32	30	34	33
32	31	35	34
32	32	36	37
32	34	36	33
32	35	37	35
33	36	37	32

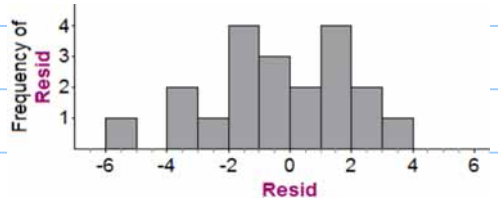


Response attribute (numeric): After

Predictor	Coefficient	Std Error	t Statistic	P Value	ΔR^2
Constant	32.3161	7.4392	4.344	0.0004	
Before	0.0252	0.2245	0.112	0.9118	0.0007

Regression Equation: $\widehat{After}$ = 32.3160690571 + 0.025232403718 Before

R-Squared: **0.000701242**
Adjusted R-Squared: **0**
Standard Deviation of the Error: **2.38605**

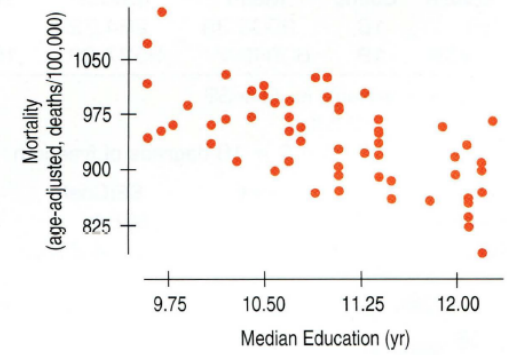


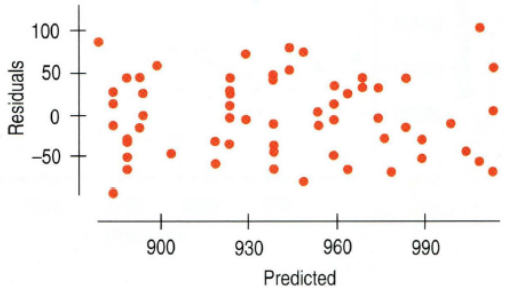
35. Education and mortality. The software output below is based on the mortality rate (deaths per 100,000 people) and the education level (average number of years in school) for 58 U.S. cities.

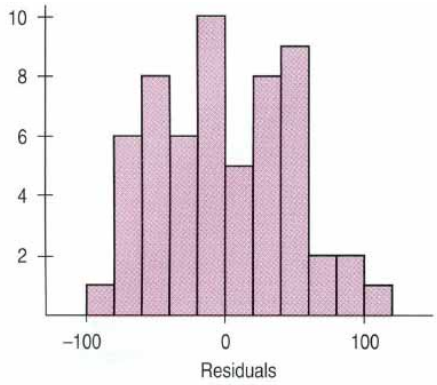
Variable	Count	Mean	StdDev
Mortality	58	942.501	61.8490
Education	58	11.0328	0.793480

Dependent variable is: Mortality
R-squared = 41.0%
s = 47.92 with 58 − 2 = 56 degrees of freedom

Variable	Coefficient	SE(Coeff)
Intercept	1493.26	88.48
Education	−49.9202	8.000







a) Comment on the assumptions for inference.
b) Is there evidence of a strong association between the level of *education* in a city and the *mortality* rate? Test an appropriate hypothesis and state your conclusion.
c) Can we conclude that getting more education is likely (on average) to prolong your life? Why or why not?
d) Find a 95% confidence interval for the slope of the true relationship.
e) Explain what your interval means.
*f) Find a 95% confidence interval for the average *mortality* rate in cities where the adult population completed an average of 12 years of school.