

## Stat 145: Exam 2 Review Answers

- (a) The correlation will be closer to 1, as this observation clearly falls outside of the linear pattern of the remaining observations.
  - (b) No the correlation would not change, as the correlation does not depend on the units of measurement.
- The population size was also increasing, thus it would be expected that the number of crimes would increase as well.
- (a) There is a moderately strong positive linear association between the two variables.
  - (b) The response variable ( $y$ ) is relative mortality rate and the explanatory variable ( $x$ ) is relative smoking rate. The slope is:

$$\begin{aligned} b &= r \left( \frac{s_y}{s_x} \right) \\ &= 0.716 \left( \frac{26.1}{17.2} \right) \\ &= 1.0865 \end{aligned}$$

The intercept is:

$$\begin{aligned} a &= \bar{y} - b\bar{x} \\ &= 109 - 1.0865(103) \\ &= -2.9095 \end{aligned}$$

The least-squares regression equation is:

$$\hat{y} = -2.9095 + 1.0865x$$

- (c) The predicted value is:

$$\begin{aligned} \hat{y} &= -2.9095 + 1.0865(110) \\ &= 116.6055 \end{aligned}$$

- (a) False; points that lie above the least-squares regression line will have positive residuals.
  - (b) True
  - (c) True

- (d) False;  $R^2$  can take on any value between 0 and 1.
5. (a) The results are biased because the sample was taken from the subscription list of a literary magazine. This is not a random sample of all U.S. adults.
- (b) The estimate 74% is likely to be too high, as those who subscribe to the magazine are more likely to have read a novel in the last year than those who don't.
6. This is an observational study, as the subjects were simply asked whether or not they had taken aspirin in the previous week. No treatments were administered to the subjects.
7. (a) Randomly assign the 50 subjects to two groups. One group, the treatment group, will receive hydroxurea. The second group, the control group, will receive a placebo. After a period of time the pain relief in the two groups will be compared.
- (b) Subjects 12, 32, and 13.
8. (a) The TV show watched.
- (b) The number of crackers eaten.
- (c) The time the show was watched (children are likely to eat more at 11:00, which is right before lunch).
9. This is an example of a block design.
10. Three problems:
- The sample is not a random sample.
  - There is nonresponse.
  - The question is leading.