STAT 310, HW 8
Due: Thursday, April 29

Reading: Section 8.1 and 8.2 from *OpenIntro*

Directions: Please submit your completed assignment to Blackboard. Your answers can either be typed using Word, or handwritten and then scanned. The best format for submission is PDF. Please convert your Word document or scan to a PDF.

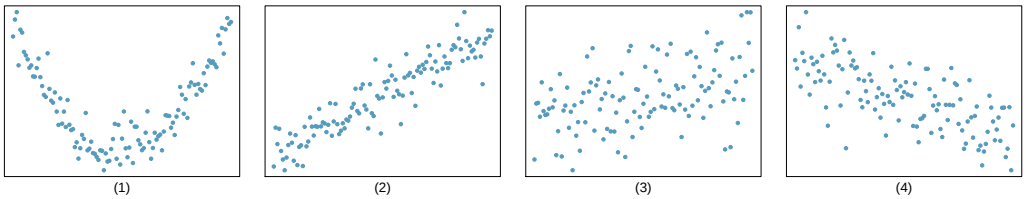
Exercise 1. Match each correlation to the corresponding scatterplot.

(a) $r = -0.7$

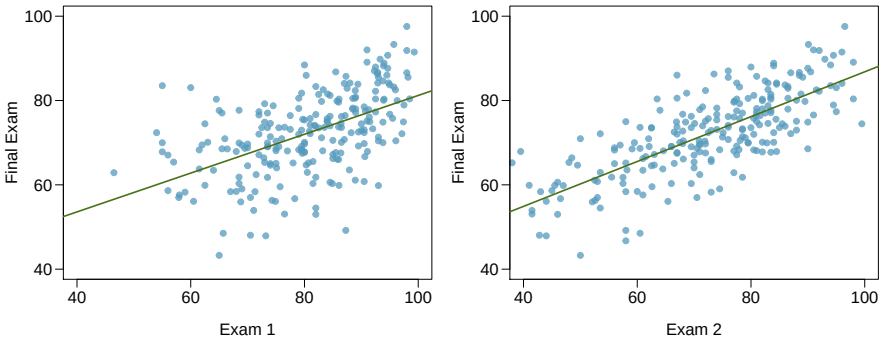
(b) $r = 0.45$

(c) $r = 0.06$

(d) $r = 0.92$



Exercise 2. The two scatterplots below show the relationship between final and mid-semester exam grades recorded during several years for a Statistics course at a university.



(a) Based on these graphs, which of the two exams has the strongest correlation with the final exam grade? Explain.

(b) Can you think of a reason why the correlation between the exam you chose in part (a) and the final exam is higher?

Exercise 3. Many people believe that gender, weight, drinking habits, and many other factors are much more important in predicting blood alcohol content (BAC) than simply considering the number of drinks a person consumed. Here we examine data from sixteen student volunteers at Ohio State University who each drank a randomly assigned number of cans of beer. These students were evenly divided between men and women, and they differed in weight and drinking habits. Thirty minutes later, a police officer measured their blood alcohol content (BAC) in grams of alcohol per deciliter of blood.

Below is the output from fitting a simple linear regression model to this data in R. A scatterplot with the least squares line is also displayed.


```
Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) -0.012701   0.012638  -1.005    0.332
beers        0.017964   0.002402   7.480 2.97e-06 ***
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.02044 on 14 degrees of freedom
Multiple R-squared:  0.7998,Adjusted R-squared:  0.7855
F-statistic: 55.94 on 1 and 14 DF,  p-value: 2.969e-06
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(a) Describe the association between number of cans of beer and BAC.

(b) What are the explanatory and response variables for the linear regression model?

(c) Write the equation for the least squares line.

(d) Interpret the slope.

(e) Interpret the intercept.

(f) What is the predicted BAC for a person that drank 5 cans of beer?

(g) A student in this data set drank 9 beers and had a measured BAC of 0.19. Calculate the residual for this student.

(h) Interpret the R^2.