Math 135 -- Test 2
March 2, 2009 Name _____

Take your time and make sure you follow all instructions. Where necessary, work must be shown in order to receive partial credit. Include input into the calculator in order to receive partial credit.

1. An automobile manufacturer reports that they sold 125,567 of a certain model with an average price of $21,355. To test this claim a consumer group selects 100 owners that purchased the model and found the buyers paid an average price of $22,360. Also an automobile magazine contacts 250 owners of the specified model and found the buyers paid an average price of $20,980. [2 pts each]

   A. Parameter B. Population C. Sample D. Statistic E. Variability

   _____ a. The 250 is a what.

   _____ b. The $21,355 is a what.

   _____ c. The $22,360 and the $20,980 illustrate what..

   _____ d. The $22,360 is a what.

   _____ e. The 125,567 is a what.

2. A consumer group wants to assess public opinion on airlines. [2 pts each]

   F. Census G. Cluster Sample H. Convenience Sample
   I. Multistage Sample J. Simple Random Sample (SRS) K. Stratified Random Sample
   L. Systematic Sample M. Voluntary Response Sample

   _____ a. Contact every 30^{th} person listed on flights arriving at an airport.

   _____ b. Randomly select 3 flights flying out of an airport and contact everyone on the selected flights.

   _____ c. Randomly select 500 passengers on flights leaving an airport.

   _____ d. Among all passengers arriving at an airport, randomly select 20 passengers flying first class, 30 passengers flying business class, and 200 passengers flying economy.

   _____ e. Place a poll on a travel website, asking visitors to respond.

   _____ f. Randomly select 5 airports. From the selected airports randomly select 10 flights. Then randomly select 20 passengers on the selected flights to contact.

   _____ g. Contact every passenger that has flown in the past year.

3. Match each of the following. [2 pts each]

A. Anecdote B. Experiment C. Prospective Study D. Retrospective Study

_____ a. A researcher notices a patient responds favorably to a new drug for diabetes.

_____ b. To measure the long term side effects of a drug, a researcher identifies 300 patients who have been using the drug over the last year.

_____ c. A researcher randomly assigns half of 300 diabetes patients into a group receiving a new drug yet to be released and the other half into a group receiving an older drug.

_____ d. A researcher identifies 200 patients using a certain diabetes medication. The researcher keeps in contact with the patients over the next 2 years to see if the patients encounter any serious side effects.

4. What problem is illustrated with each example? [2 pts each]

E. Blinding G. Confounding I. Placebo Effect K. Undercoverage
F. Common Response H. Nonresponse J. Response Bias

_____ a. A survey is conducted by trying to contact households during working hours.

_____ b. The administration wants to assess student opinion on the future construction of a new residential college building. Two hundred students taking honors English are randomly selected to contact.

_____ c. Local law enforcement notice that wrecks have decreased since new traffic lights have been installed and speed limits have been reduced on area roads.

_____ d. When a person answers survey questions in a way to please an interviewer.

_____ e. Ten percent of subjects in the control group of a trial of a gingko biloba report improvement in memory.

_____ f. A study shows there is a positive association between the size of house and the average life expectancy of the members of household.

_____ g. A patient in a drug trial does not realize she is in the group receiving the new drug.

5. Use the scatterplots below to answer the following questions. [4 pts each]

_____ a. Which has a strong nonlinear association?

_____ b. Which has a negative linear association?

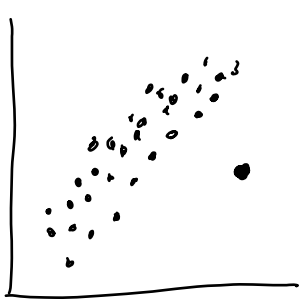
_____ c. Which will have correlation that is approximately 0?

_____ d. Which will have a correlation that is approximately 0.9?

_____ e. Which has an unusual point that is influential?

_____ f. Which has an unusual point that high leverage and small residual?

A)



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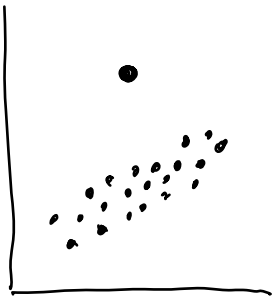

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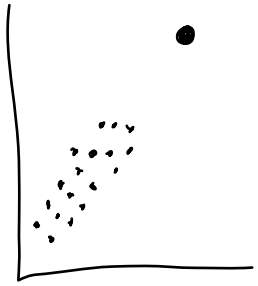

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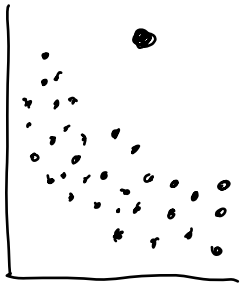
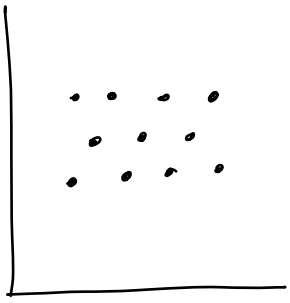


E)

F)



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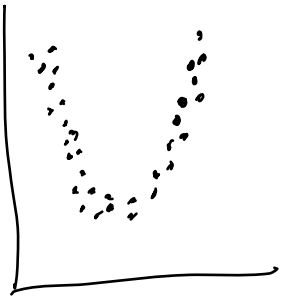

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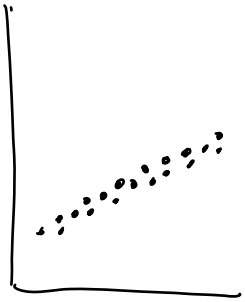

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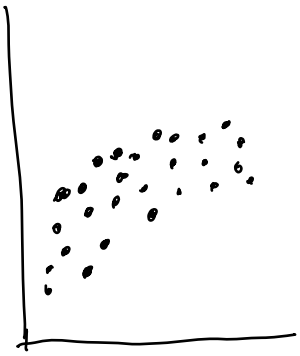

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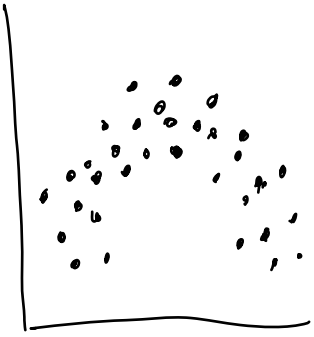

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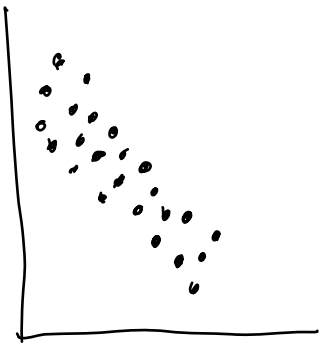
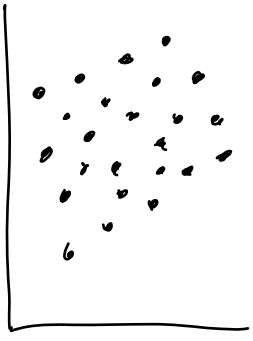


L)



6. The age of a tree can be determined by counting the rings after a tree has been cut down. A researcher wants to know if a tree's age can be estimated by the diameter of the trunk. The following table summarizes the measurements taken by some recently cut trees [30 pts]

a) Sketch a scatterplot (Label your axis!)

Diameter (in.)	Age (yr)
1.8	5
2.2	8
4.4	8
7.7	10
6.5	14
10.1	18
12.8	22
14.3	25
13.2	30
17.6	33
15.4	35
16.5	40
16.5	42

b) Determine the correlation.

c) Determine the equation of the least squares regression line ($\hat{y} = a + bx$).

d) Use the regression line to predict the age of a tree with a diameter of 12 in.

e) Would the linear model generally overestimate or underestimate the ages of trees with very large diameters? Explain.