

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. A fertilizer manufacturer is doing field tests of a new brand of fertilizer across a county that produces 4500 acres of soybeans each year. The manufacturer randomly selects 50 acres of soybeans which average 105.2 bushels per acre. The manufacturer selects a different 50 acres which average 108.4 bushels per acre. At the end of harvesting, the yield in the county is determined to be 106.5 bushels per acre. [2 pts each]

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

- \_\_\_\_\_ a. The difference between 105.2 and 108.4 is an example of what.
- \_\_\_\_\_ b. The 4500 acres is an example of a what.
- \_\_\_\_\_ c. The 108.4 is an example of a what.
- \_\_\_\_\_ d. The 106.5 is an example of a what.
- \_\_\_\_\_ e. The 50 acres is an example of what.

2. A consumer group wants to assess public opinion on the brands of automobiles. . [2 pts each]

- |                              |                               |                             |
|------------------------------|-------------------------------|-----------------------------|
| A. Census                    | B. Simple Random Sample (SRS) | C. Stratified Random Sample |
| D. Cluster Sample            | E. Multistage Sample          | F. Systematic Sample        |
| G. Voluntary Response Sample | H. Convenience Sample         |                             |

- \_\_\_\_\_ a. Ask visitors to the group's website to respond to an online survey.
- \_\_\_\_\_ b. Contact every 25<sup>th</sup> person from the motor vehicle registration list.
- \_\_\_\_\_ c. Randomly select 100 registered car owners.
- \_\_\_\_\_ d. Randomly select 50 female drivers and 50 male drivers.
- \_\_\_\_\_ e. Contact every registered car owner.
- \_\_\_\_\_ f. Randomly select 5 counties in the US and contact every registered car owner in each.
- \_\_\_\_\_ g. Contacts car owners as they enter Wal-mart.

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

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

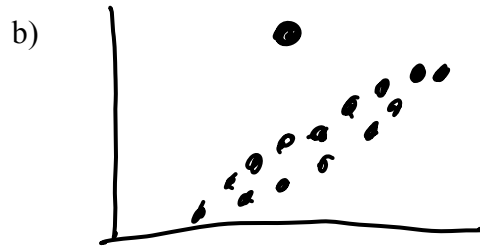
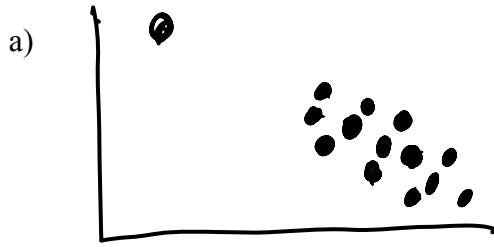
- \_\_\_\_\_ a. A researcher identifies 300 past winners of game shows to see how they have adapted to winning.
- \_\_\_\_\_ b. A researcher interviews a winner of the Powerball lottery game who claims that after winning their life has changed for the worse.
- \_\_\_\_\_ c. A researcher has 100 students learn to play an instrument. After 1 year the change in students' GPAs are measured.
- \_\_\_\_\_ d. A researcher identifies 200 first year freshmen. The GPAs of the students are compared over their 4 years of college to see if those that join the Greek system get better grades.

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

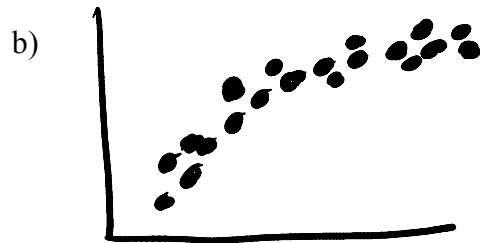
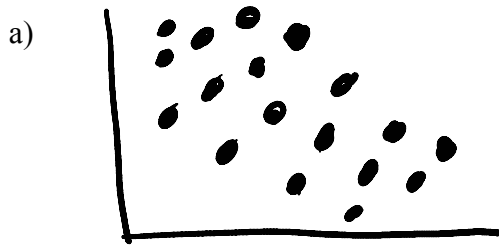
E. Common Response      F. Confounding      G. Nonresponse  
 H. Placebo Effect      I. Response Bias      J. Undercoverage  
 K. Blinding

- \_\_\_\_\_ e. A patient in a test of a new acid reducing drug does not know if they are receiving the drug or not.
- \_\_\_\_\_ f. A scientist claims that tick bites cause drownings since there is a positive association between the number of tick bites in a month and the number of drownings in a month.
- \_\_\_\_\_ g. A patient in a test of a new acid reducing drug says they have not had any acid reflux since being in the trial even though they are in the control group.
- \_\_\_\_\_ h. To get opinion on the new road through Land Between the Lakes. The Transportation Department asks people's opinion as they arrive at the Golden Pond Visitor Center.
- \_\_\_\_\_ i. The health department notes that illness across the community has gone down after encouraging more thorough hand washing and encouraging multivitamin consumption.
- \_\_\_\_\_ j. A question on a survey asks, "Because numerous companies are polluting the air in a community should they be required to pay part of the community's health care?"
- \_\_\_\_\_ k. A researcher sends out 10,000 surveys to current users of an allergy drug. The respondents are asked to answer questions about side effects and benefits and return the survey.

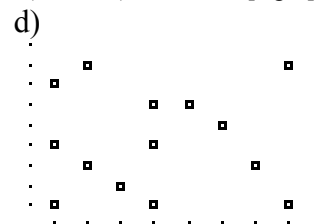
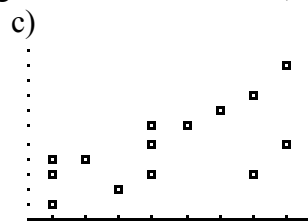
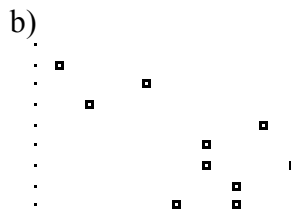
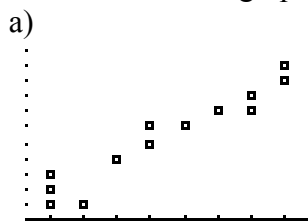
5. Each of the following scatter plots has an unusual point. Determine if the point has high or low leverage, large or small residual, and if the point is influential. [6 pts each]



6. For the following scatter plots determine the form (shape), direction, and strength. [6 pts each]



7. Match each of the graphs with the one of the following correlations:  $-0.658$ ,  $0.012$ ,  $0.674$ ,  $0.953$ . [8 pts]



8. The following lists the number of employees that quit per 100 employees and the average hourly wage in a sample of 10 manufacturing industries. Economic theory suggest that the quit rate is related to the wage. [27 pts]

a) Sketch a scatterplot (Label your axis!)

Wage (\$x)	Quit Rate (y)
8.2	1.4
10.3	0.7
6.1	2.6
5.3	3.4
9.9	1.7
9.1	1.7
10.5	1.0
13.2	0.5
7.9	2.0
5.4	3.8

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 quit rates if the average wages were \$1 and \$8. Which of these would you not trust and why?