

### Exam 1 Review

The following problems are meant to help you review for the exam. However, this review is not complete. To adequately study, you should review your homework, class assignments and labs.

1. A college newspaper is interested in the average number of drinks college students age 18 – 22 have had at a party.
  - a. What is the population?
  - b. What is the parameter of interest? (In words. Be complete)
  - c. What is the variable?
  - d. This particular study was done by taking previous survey results and existing data bases to reach their findings. What type of sampling is this?
  - e. The number of drinks a student has had at a party is what kind of data? (qualitative, quantitative discrete, or quantitative continuous)
2. Describe at least one problem you might have in obtaining a representative sample if you were to do a mail-in survey. In this type of survey, you would mail the surveys to your sample and each person would have to mail back their completed survey to you.
3. **Sixty** randomly selected students were asked the number of telephone calls they received yesterday. The results are as follows:

# phone calls	frequency	rel. frequency	cumulative rel. frequency
1	6		
2	25		
3	12		
4			
6	9		

- a. Fill in the blanks in the above table. Round decimals to 4 decimal places.
  - b. Find the sample mean,  $\bar{x}$ . \_\_\_\_\_
  - c. Find the sample standard deviation,  $s$ . \_\_\_\_\_
  - d. Find the 70<sup>th</sup> percentile. \_\_\_\_\_
  - e. Find the mode. \_\_\_\_\_
  - f. Find the third quartile, Q3. \_\_\_\_\_
  - g. What percent of the students received at least 4 phone calls?
4. Construct a boxplot of the data in problem #3. Use a ruler to scale your axis. . You may use your calculator and then copy the result neatly on paper.

5. At Whatsamatta University, students rate professors on a scale of 1 to 10 with 10 being the highest. Last fall semester the following ratings were collected for three different professors in three different departments:

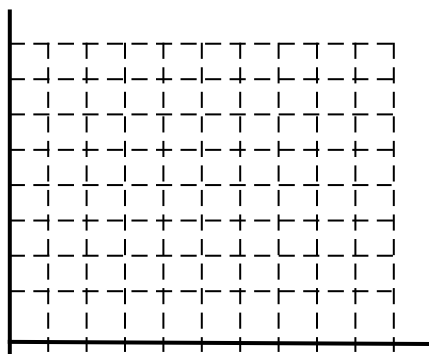
Professor	Rating	Department	Dept. Mean $\bar{x}$	St. Dev. $s$
A	10	History	8	4
B	7	Phys Ed	9	1
C	8	Math	4	2

Which of the three professors was the best professor compared to his or her department? Explain your reasons for your answer. Be complete in your answer.

6. Attached are per capita cigarette sales together with lung cancer death rates for 10 randomly chosen states in 1960.

State	# cigarettes sold (hundred cigarettes per person)	Lung Cancer Death Rate (per hundred thousand)
CT	31.10	22.83
OK	23.44	19.45
WV	22.86	15.53
IO	22.12	16.59
TX	22.57	20.74
DE	33.60	24.55
TE	20.08	17.60
SC	18.06	17.45
AK	30.34	25.88
UT	14.00	12.01

- a. Enter the data into your calculator and graph a scatterplot for the data. Copy your scatterplot on the axes below. Do this accurately. Scale your axes.



- b. Calculate the least squares (best fit) line for the data. Write your equation below.
- c. What is the correlation coefficient?      Corr = \_\_\_\_\_ (to 4 dec. places)
- d. Is the correlation significant? Show your work in how you determined this.
- e. Predict the lung cancer death rate if the number of cigarette sold per capita is 20 hundred. If the number sold per capita is 40 hundred.
- f. Carefully draw your regression line on the graph.

7. Ninety homeowners were asked the number of estimates they obtained before having their homes fumigated for termites. The results are given in the following graph:



- Calculate the relative frequency for each bar in the histogram.
  - Calculate the mean of the data.
  - What is the 1<sup>st</sup> quartile?
  - Find the 60<sup>th</sup> percentile.
  - Find the 90<sup>th</sup> percentile.
  - What percent of homeowners obtained at least 3 estimates?
8. Use the data for problem #7. Suppose that a homeowner had obtained 10 estimates. Would that be considered an outlier? Show how you got your answer.
9. An antigun advocate wants to estimate the percentage of people who favor stricter gun laws. He conducts a nation-wide survey of 1203 randomly-selected 18 years and older. The interviewer asks the respondents: “Do you favor harsher penalties for individuals who sell guns illegally?” Do you feel that the question was a good one to ask? Explain why or why not.

### Answers to Exam 1 Review

- All college students aged 18 – 22
  - the average number of drinks college students aged 18 – 22 have had at a party.
  - the number of drinks that one college student aged 18 – 22 has had at a party.
  - convenience
  - quantitative – discrete
- people in the sample may not fill out or may not mail back the survey
- b. 2.9667 c. 1.5290 d. 3 e. 2 f. 4 g. 28.33%
- Professor C was the best professor compared to his or her department because his rating was a full 2 standard deviations above the mean, while Professor a was only ½ standard deviation above.
- b.  $\hat{y} = 4.2203 + .6316x$  c. .9031 d. yes e. 16.85; 29.48
- a. 0.2; 0.2; 0.3; 0; 0.2; 0; 0.1 b. 3.2 c. 2 d. 3 e. 6 f. 60%
- yes.  
 Method 1:  $\bar{x} = 3.2$  and  $s_x = 1.84$ . #st.dev =  $(10 - 3.2) / 1.84 = 3.70$ . The data value is more than 3 standard deviations above the mean.  
 Method 2:  $Q1 = 2$ ,  $Q3 = 5$ ,  $IQR = 5 - 2 = 3$ .  $Q3 + 1.5 * IQR = 5 + 4.5 = 9.5$ . Since 10 is more than 9.5, it is an outlier.
- no. Explanations will vary