MATH120 STATISTICS REVIEW1 Chapters 1-3.

1.1 Determine whether the underlined value is a parameter or a statistic.

   1) 29.2% of the mayors of cities in a certain state are from minority groups.

   2) A study of 2700 college students in the city of Pemblington found that 14% had been victims of violent crimes.

Provide an appropriate response.

   3) Quantitative variables classify individuals in a sample according to _____. Give an example.

   4) Qualitative variables classify individuals in a sample according to _____. Give an example

Determine whether the quantitative variable is discrete or continuous.

   5) the number of bottles of juice sold in a cafeteria during lunch

   6) the weight of a player on the wrestling team

Determine the level of measurement of the variable.

   7) an officer's rank in the military
        A) nominal   B) ordinal   C) ratio   D) interval

   8) the native language of a tourist
        A) nominal   B) ratio   C) interval   D) ordinal

   9) the year of manufacture of a car
        A) ordinal   B) interval   C) nominal   D) ratio

   10) height of a tree
        A) nominal   B) ordinal   C) ratio   D) interval

Provide an appropriate response.

   11) A survey of 1248 American households found that 91% of the households own a DVD recorder. Identify the population and the sample..

1.2 Determine whether the study depicts an observational study or an experiment.

   12) A medical researcher obtains a sample of adults suffering from diabetes. She randomly assigns 30 people to a treatment group and 30 to a placebo group. The treatment group receives a medication over a period of three months and the placebo group receives a placebo over the same time frame. At the end of three months the patients' symptoms are evaluated.

   13) The personnel director at a large company would like to determine whether the company cafeteria is widely used by employees. She calls each employee and asks them whether they usually bring their own lunch, eat at the company cafeteria, or go out for lunch.

Provide an appropriate response.

14) A researcher wanted to determine whether colon cancer was associated with eating meat. He selected a sample of 500 men with colon cancer and an equal number of men without colon cancer. The two groups were matched – in other words they were similar in terms of age, occupation, income, and exercise levels. Histories on the amount of meat consumed over the previous twenty years were obtained for all men. The total amount of meat that each man eaten in the previous twenty years was estimated. The meat consumption was compared for the two groups. After the analysis, the researcher concluded that consumption of more meats was associated with an increase in colon cancer. What is the responce variable? What is the explanatory variable? Can the researchers say that the consumption of more meat will cause colon cancer? Explain.

1.3 Provide an appropriate response.

15) The top 38 cities in Wisconsin as determined by population are given below. Select a random sample of four cities from the list below using the two digit list of random numbers provided. Begin with the uppermost left random number and proceed down each column. When a column is complete, use the numbers at the top of the next right column and proceed down that column. Information was obtained from the web site http://www.citypopulation.de/USA–Wisconsin.html.

Wisconsin Cities by Population

1	Milwaukee	9	Eau Claire	17	New Berlin	25	West Bend	33	Watertown
2	Madison	10	Janesville	18	Wausau	26	Superior	34	Muskego
3	Green Bay	11	West Allis	19	Greenfield	27	Mount Pleasant	35	De Pere
4	Kenosha	12	La Crosse	20	Beloit	28	Neenah	36	Fitchburg
5	Racine	13	Sheboygan	21	Manitowoc	29	Stevens Point	37	South Milwaukee
6	Appleton	14	Wauwatosa	22	Menomonee Falls	30	Caledonia	38	Grand Chute
7	Waukesha	15	Fond du Lac	23	Franklin	31	Sun Prairie		
8	Oshkosh	16	Brookfield	24	Oak Creek	32	Mequon		

Random Numbers

21	49	6	6	19	15	11	17
12	43	4	31	7	18	1	43
23	30	2	24	21	18	6	48
44	12	20	32	2	28	12	38
8	30	38	43	41	29	3	13

1.4 Identify the type of sampling used. Choose from simple random, cluster, convenience, systematic, or stratified.

16) Thirty–five math majors, 33 music majors and 45 history majors are randomly selected from 251 math majors, 518 music majors and 332 history majors at the state university. What sampling technique is used?

17) Every fifth adult entering an airport is checked for extra security screening. What sampling technique is used?

18) At a local technical school, five auto repair classes are randomly selected and all of the students from each class are interviewed. What sampling technique is used?

19) A statistics student interviews everyone in his apartment building to determine who owns a cell phone. What sampling technique is used?

20) A lobbyist for the oil industry assigns a number to each senator and then uses a computer to randomly generate ten numbers. The lobbyist contacts the senators corresponding to these numbers. What sampling technique was used?

1.5 Provide an appropriate response.

21) An online newspaper conducted a survey by asking, "Do you support the lowering of air quality standards if it could cause the death of millions of innocent people from pollution related diseases?" Determine the type of bias.

22) A local hardware store wants to know if its customers are satisfied with the customer service they receive. The store posts an interviewer at the front of the store to ask the first 95 shoppers who leave the store, "How satisfied, on a scale of 1 to 10, were you with this store's customer service?" Determine the type of bias.

23) Before opening a new dealership, an auto manufacturer wants to gather information about car ownership and driving habits of the local residents. The marketing manager of the company randomly selects 1000 households from all households in the area and mails a questionnaire to them. Of the 1000 surveys mailed, she receives 100 back. Determine the type of bias.

1.6 Provide an appropriate response.

24) A drug company wanted to test a new depression medication on postpartum females. The researchers found 200 women aged 25–35 and randomly assigned them to two groups. The first group received the new drug, while the second received a placebo. After one month of treatment, the percentage of each group whose depression symptoms decreased was recorded and compared.
   a. What is the response variable?   b. What is the explanatory variable?
   c. What is/are the treatments?   d. What is the population?
   f. What is the sample?

2.1 Provide an appropriate response. Round relative frequencies to 2 decimals.

25) The preschool children at Elmwood Elementary School were asked to name their favorite color. The results are listed below. Construct a frequency distribution, a relative frequency distribution, bar graph and pie chart

purple	purple	green	red	blue
blue	blue	purple	blue	green
blue	green	red	red	red
green	blue	red	blue	yellow

2.2 Provide an appropriate response.

26) A sample of 15 Boy Scouts was selected and their weights (in pounds) were recorded as follows:
       97   120   137   124   117
      108   134   126   123   106
      130   110   100   120   140
   a. Using a class width of 10, starting with a lower limit of 95 for the first class. Construct a frequency distribution for the data.
   b. Construct a frequency histogram

Construct a stem–and–leaf plot for the data.

27) The number of home runs that Mark McGwire hit in the first 13 years of his major league baseball career are listed below. (Source: Major League Handbook) Construct a stem–and–leaf plot for this data.
       3   49   32   33   39   22   42   9   9   39   52   58   70

2.3 Construct a frequency polygon for the data and a relative frequency ogive. (recall use midpoints)

28)

Height (in inches)	Frequency
50 – 52	5
53 – 55	8
56 – 58	12
59 – 61	13
62 – 64	11

CH3 Provide an appropriate response.

29) Find the mean, median, and mode of the following statistic students' test scores:

    58 61 54 58 51 59 58 52 53 56

Provide an appropriate response.

30) The annual profits of ten internet businesses are listed below. Find the mean and median profits. Round the median to the nearest dollar. Which measure– the mean or the median– best represents the data? Explain your reasoning.

    $1,172,246 $163,659 $440,584 $350,634 $290,596
    $186,731 $145,809 $143,209 $139,096 $125,106

31) In a random sample, 10 employees at a local plant were asked to compute the distance they travel to work to the nearest tenth of a mile. The data is listed below. Compute the range, sample standard deviation and sample variance of the data.

    1.1 5.2 3.6 5.0 4.8 1.8 2.2 5.2 1.5 0.8

32) The costs (in dollars) of 10 college math textbooks are listed below. Find the population standard deviation and the population variance.

    70 72 71 70 69 73 69 68 70 71

33) The scores from a state standardized test have a bell–shaped distribution with a mean of 100 and a standard deviation of 15. Use the Empirical Rule to find the percentage of students with scores between 70 and 130. between 70 and 85. above 130

34) A study was designed to investigate the effects of two variables – (1) a student's level of mathematical anxiety and (2) teaching method – on a student's achievement in a mathematics course. Students who had a low level of mathematical anxiety were taught using the traditional expository method. These students obtained a mean score of 290 with a standard deviation of 50 on a standardized test. Assuming no information concerning the shape of the distribution is known, what percentage of the students scored between 190 and 390?

35) For the following data, approximate the mean number of unused vacation days at the end of the year.

Days	Frequency
1–3	28
4–6	27
7–9	1
10–12	5
13–15	4

36) For the following data set, approximate the sample standard deviation of unused vacation days.

Days	Frequency
1–2	9
3–4	12
5–6	8
7–8	5
9–10	4

37) The grades are given for a student for a particular term. Find the grade point average. The point values of grades are given below.
A : 4,   B : 3,   C : 2,   D : 1,   F : 0

Grade	Credit Hours
D	3
A	2
A	2
D	3
A	3

38) A student scores 62 on a geography test and 261 on a mathematics test. The geography test has a mean of 80 and a standard deviation of 15. The mathematics test has a mean of 300 and a standard deviation of 26. If the data for both tests are normally distributed, on which test did the student score better relative to the other students in each class?

39) When results from a scholastic assessment test are sent to test–takers, the percentiles associated with their scores are also given. Suppose a test–taker scored at the 78th percentile for their verbal grade and at the 34th percentile for their quantitative grade. Interpret these results.
   A) This student performed better than 22% of the other test–takers in the verbal part and better than 66% in the quantitative part.
   B) This student performed better than 78% of the other test–takers in the verbal part and better than 34% in the quantitative part.
   C) This student performed better than 78% of the other test–takers in the verbal part and better than 66% in the quantitative part.
   D) This student performed better than 22% of the other test–takers in the verbal part and better than 34% in the quantitative part.

40) The cholesterol levels (in milligrams per deciliter) of 30 adults are listed below. Draw a boxplot that represents the data.

154 156 165 165 170 171 172 180 184 185
189 189 190 192 195 198 198 200 200 200
205 205 211 215 220 220 225 238 255 275

1) parameter
2) statistic
3) numerical measure; weight,tempature, number of people ...
4) categories; color, state, letter grade ...
5) discrete
6) continuous
7) B
8) A
9) B
10) C
11) population: collection of all American households; sample: collection of 1248 American households surveyed
12) experiment
13) observational study
14) if they have colon cancer, amount of meat consumed, NO association does not imply causation.
15) Manitowoc, La Crosse, Franklin, Oshkosh.
16) stratified
17) systematic
18) cluster
19) convenience
20) simple random
21) Response bias; poorly worded question
22) Sampling bias; the customers are not chosen through a random sample.
23) Nonresponse bias
24) a. level of deprssion   b. the medication   c. taking the medication or not
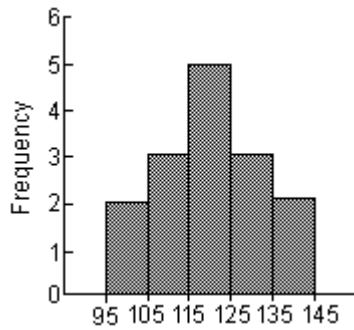   d. all postpartum females   e. 200 women in the study
25)

Color	Frequency	Relative Frequency
purple	3	0.15
green	4	0.20
red	5	0.25
blue	7	0.35
yellow	1	0.05

26) a.

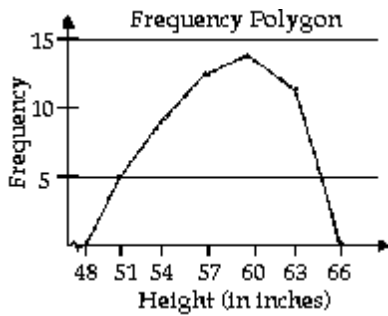| Weight (lb)	Tally	Frequency
95–104	ll	2
105–114	lll	3
115–124	lllll	5
125–134	lll	3
135–144	ll	2

b.

27)

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0 | 3 9 9
1 |
2 | 2
3 | 2 3 9 9
4 | 2 9
5 | 2 8
6 |
7 | 0
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28)

29) mean 56, median 57, mode 58

30) mean: $315,767; median: $175,195; the median since there is an outlier

31) range = 4.4 miles, s = 1.8 miles, $s^2 = 3.324$

32) $\sigma = \$1.42$, $\sigma^2 = 2.01$

33) 95%, 13.5%, 2.5%

34) at least 75%

35) 5.3

36) 2.6 days

37) 2.62

38) The student scored better on the geography test.

39) B

40)