

Fellowship Christian School  
**Entering DE Honors Statistics Summer Packet - 2018**

Name: \_\_\_\_\_

Instructions:

This summer packet is **a study guide for your first quiz in the course**. It will not be graded; instead you will be assessed over the content between 3-5 days after the start of school in the fall. The concepts in this packet cover prerequisite skills, and there is an answer key at the end of the packet. If there are any concepts and/or skills that you've forgotten, please look them up on the web and/or use your class notes from years past. Please be sure to spend adequate time and effort working out the practice problems in this packet and checking your answers so that you can be well prepared for your first quiz in August.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response. Use the space below each question for your answer.

1) Explain the difference between a sample and a population. 1) \_\_\_\_\_

2) If you had to do a statistical study, would you use a sample or a population? Why? 2) \_\_\_\_\_

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the data set is a population or a sample.

3) The age of every fourth person entering a department store 3) \_\_\_\_\_

A) sample

B) population

4) The age of each employee at a local grocery store 4) \_\_\_\_\_

A) population

B) sample

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Identify the population AND the sample. Use the space below each question for your answers, if needed.

5) A survey of 1212 American households found that 52% of the households own a computer. 5) \_\_\_\_\_

6) When 1348 American households were surveyed, it was found that 57% of them owned two cars. 6) \_\_\_\_\_

7) A survey of 2625 elementary school children found that 28% of the children could be classified as obese. 7) \_\_\_\_\_

Determine whether the bold numerical value is a parameter or a statistic. Explain your reasoning.

8) A recent survey by the alumni of a major university indicated that the average salary of 10,500 of its 200,000 graduates was \$130,000. 8) \_\_\_\_\_

9) The average salary of all assembly-line employees at a certain car manufacturer is \$44,000. 9) \_\_\_\_\_

10) A survey of 1040 students was taken from a university with 19,000 students. 10) \_\_\_\_\_

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the study is an observational study or an experiment.

11) A medical researcher obtains a sample of adults suffering from diabetes. She randomly assigns 89 people to a treatment group and 89 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. 11) \_\_\_\_\_

A) experiment B) observational study

12) A poll is conducted in which professional musicians are asked their ages. 12) \_\_\_\_\_

A) experiment B) observational study

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. 13) \_\_\_\_\_

A) experiment B) observational study

14) A scientist was studying the effects of a new fertilizer on crop yield. She randomly assigned half of the plots on a farm to group one and the remaining plots to group two. On the plots in group one, the new fertilizer was used for a year. On the plots in group two, the old fertilizer was used. At the end of the year the average crop yield for the plots in group one was compared with the average crop yield for the plots in group two. 14) \_\_\_\_\_

A) observational study B) experiment

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response. Use the space below each question for your answer.

15) Explain the differences between cluster sampling and stratified sampling. 15) \_\_\_\_\_

16) Explain the difference between a census and a sampling and describe the advantages and disadvantages of each. 16) \_\_\_\_\_

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Identify the sampling technique used.

17) Thirty-five sophomores, 30 juniors and 33 seniors are randomly selected from 281 sophomores, 242 juniors and 529 seniors at a certain high school. 17) \_\_\_\_\_

- A) cluster
- B) random
- C) convenience
- D) stratified
- E) systematic

18) Every fifth person boarding a plane is searched thoroughly. 18) \_\_\_\_\_

- A) systematic
- B) stratified
- C) cluster
- D) convenience
- E) random

19) At a local community college, five statistics classes are randomly selected out of 20 and all of the students from each class are interviewed. 19) \_\_\_\_\_

- A) random
- B) cluster
- C) convenience
- D) stratified
- E) systematic

20) A community college student interviews everyone in a particular statistics class to determine the percentage of students that own a car. 20) \_\_\_\_\_

- A) cluster
- B) convenience
- C) random
- D) stratified
- E) systematic

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

- 21) The numbers of home runs that Sammy Sosa hit in the first 15 years of his major league baseball career are listed below. Make a stem-and-leaf plot for this data. 21) \_\_\_\_\_

4 15 10 8 33 25 36 40 36 66 63 50 64 49 40

What can you conclude about the data?

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 22) For the stem-and-leaf plot below, what is the maximum and what is the minimum entry? 22) \_\_\_\_\_

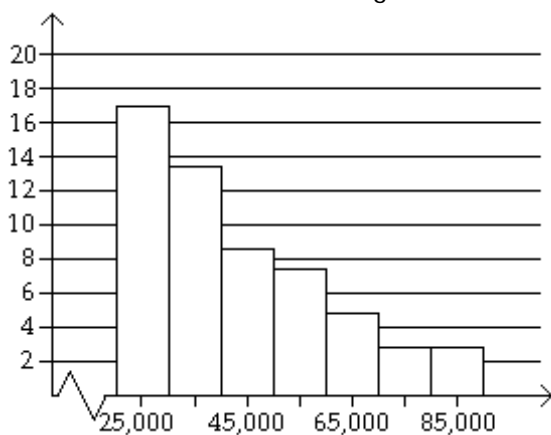
Key : 11 | 8 = 11.8

11		5 8
12		4 6 6 7 8 9
13		0 1 1 2 3 6 6 7 8 8
14		3 4 6 6 8 9 9 9
15		0 1 1 2 3 7 7 8 9
16		2 2 5 7 8 8 9 9
17		5 9

- A) max: 17.5; min: 11.5  
C) max: 179; min: 115

- B) max: 17.9; min: 11.8  
D) max: 17.9; min: 11.5

- 23) Determine whether the approximate shape of the distribution in the histogram is symmetric, uniform, skewed left, skewed right, or none of these. 23) \_\_\_\_\_



A) skewed left

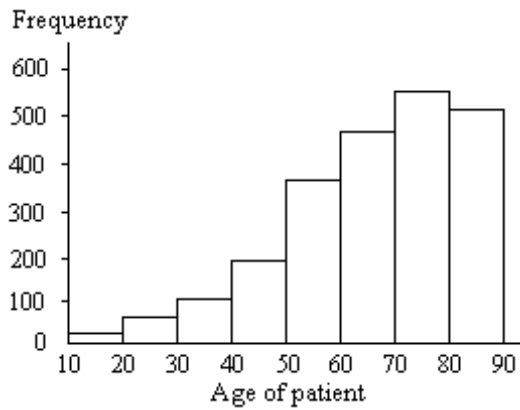
B) symmetric

C) uniform

D) skewed right

- 24) Determine whether the approximate shape of the distribution in the histogram is symmetric, uniform, skewed left, skewed right, or none of these.

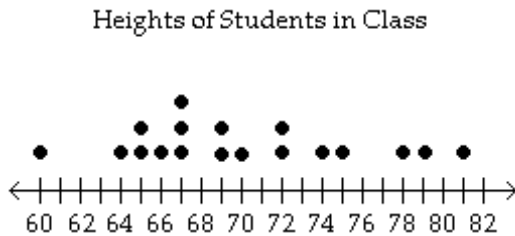
24) \_\_\_\_\_



- A) uniform      B) skewed left      C) symmetric      D) skewed right

- 25) Find the mean, median, and mode of the data.

25) \_\_\_\_\_



- A)  $\bar{x} = 70$ ; median = 69; mode = 67      B)  $\bar{x} = 70$ ; median = 67; mode = 69  
 C)  $\bar{x} \approx 70.1$ ; median = 69; mode = 68      D)  $\bar{x} \approx 70.3$ ; median = 69; mode = 68

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 26) Find the mean, median, and mode of the following numbers:

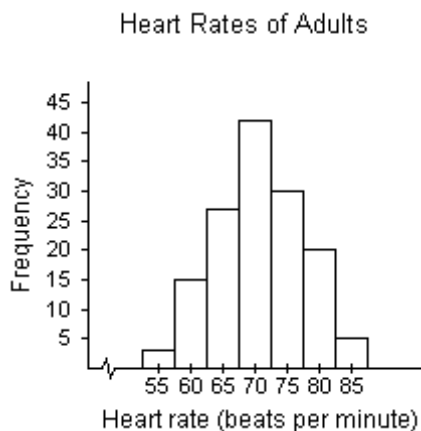
26) \_\_\_\_\_

96 99 92 96 89 97 96 90 91 94

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

27) Use the histogram below to approximate the mean heart rate of adults in the gym.

27) \_\_\_\_\_



A) 1425.7

B) 70

C) 70.8

D) 31.6

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

28) What is the difference between using  $\mu$  and  $\bar{x}$  to represent a mean?

28) \_\_\_\_\_

29) On a recent Statistics test, the scores were 15, 66, 66, 81, 82, 83, 85, 88, 90, 92, 93, and 95. Is the mean a good representation of the center of data? If not, why?

29) \_\_\_\_\_

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

30) The cost of five homes in a certain area is given.

30) \_\_\_\_\_

\$144,000   \$152,000   \$172,000   \$142,000   \$1,222,000

Which measure of central tendency should be used?

A) mean

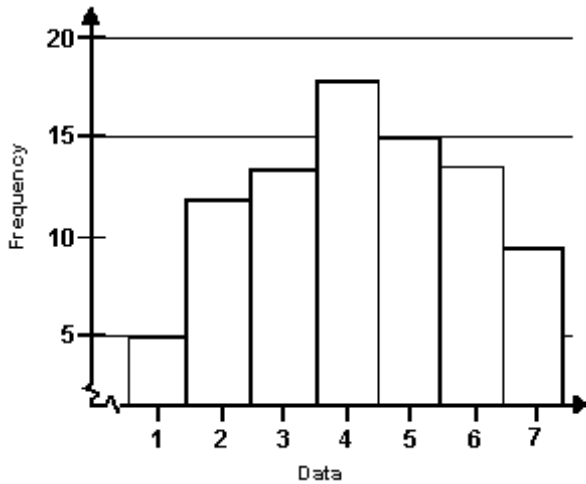
B) median

C) midrange

D) mode

31) Find the range of the data set represented by the graph.

31) \_\_\_\_\_



A) 20

B) 5

C) 17

D) 6

32) The heights (in inches) of 20 adult males are listed below. Find the range of the data set.

32) \_\_\_\_\_

70 72 71 70 69 73 69 68 70 71  
67 71 70 74 69 68 71 71 71 72

A) 5

B) 6

C) 6.5

D) 7

33) Find the sample standard deviation.

33) \_\_\_\_\_

2 6 15 9 11 22 1 4 8 19

A) 2.1

B) 7.1

C) 6.3

D) 6.8

34) You are asked to compare three data sets. Without calculating, determine which data set has the greatest sample standard deviation and which has the least sample standard deviation.

34) \_\_\_\_\_

(i)

2	6
3	4
4	0 0 3 3 9 9
5	8
6	1

(ii)

2	
3	4
4	0 0 0 3 3 3 9 9
5	8
6	

(iii)

2	6
3	4 5
4	0 3 9 9
5	8 9
6	1

A) Greatest sample standard deviation: (iii)

Least sample standard deviation: (i)

C) Greatest sample standard deviation: (iii)

Least sample standard deviation: (ii)

B) Greatest sample standard deviation: (i)

Least sample standard deviation: (iii)

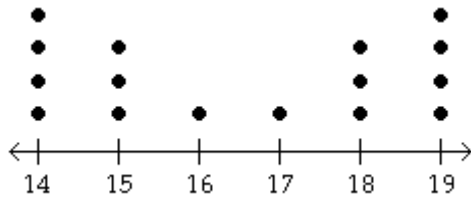
D) Greatest sample standard deviation: (i)

Least sample standard deviation: (ii)

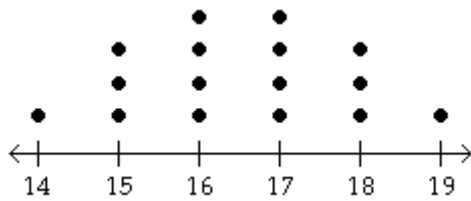
35) You are asked to compare three data sets. Without calculating, determine which data set has the greatest sample standard deviation and which has the least sample standard deviation.

35) \_\_\_\_\_

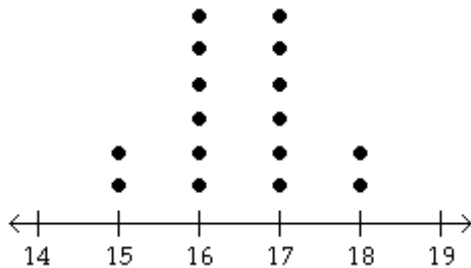
(i)



(ii)



(iii)



- A) Greatest sample standard deviation: (i)  
Least sample standard deviation: (ii)  
C) Greatest sample standard deviation: (iii)  
Least sample standard deviation: (ii)

- B) Greatest sample standard deviation: (iii)  
Least sample standard deviation: (i)  
D) Greatest sample standard deviation: (i)  
Least sample standard deviation: (iii)

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

36) The test scores of 30 students are listed below. Draw a box-and-whisker plot that represents the data.

36) \_\_\_\_\_

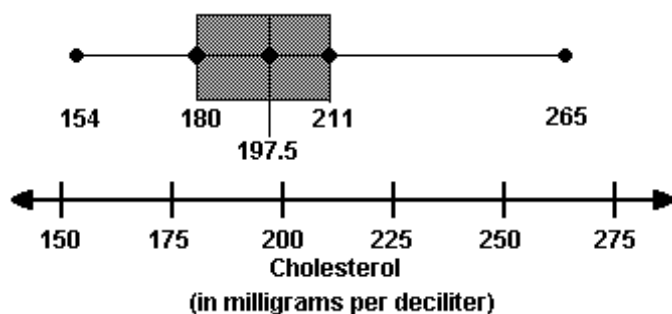
31 41 45 48 52 55 56 56 63 65  
67 67 69 70 70 74 75 78 79 79  
80 81 83 85 85 87 90 92 95 99



MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

37) Use the box-and-whisker plot below to determine which statement is accurate.

37) \_\_\_\_\_



- A) About 75% of the adults have cholesterol levels less than 180.
- B) About 25% of the adults have cholesterol levels of at most 211.
- C) One half of the cholesterol levels are between 180 and 197.5.
- D) One half of the cholesterol levels are between 180 and 211.

38) Which of the following cannot be a probability?

38) \_\_\_\_\_

- A)  $\frac{\sqrt{2}}{3}$
- B) 0
- C) -52
- D) 0.001

39) Which of the following cannot be a probability?

39) \_\_\_\_\_

- A) 0.0002
- B) 85%
- C) 1
- D)  $\frac{4}{3}$

40) Rank the probabilities of 10%,  $\frac{1}{5}$ , and 0.06 from the least likely to occur to the most likely to occur.

40) \_\_\_\_\_

- A) 0.06,  $\frac{1}{5}$ , 10%
- B) 0.06, 10%,  $\frac{1}{5}$
- C)  $\frac{1}{5}$ , 10%, 0.06
- D) 10%,  $\frac{1}{5}$ , 0.06

41) A single six-sided die is rolled. Find the probability of rolling a number less than 3.

41) \_\_\_\_\_

- A) 0.25
- B) 0.1
- C) 0.5
- D) 0.333

42) A single six-sided die is rolled. Find the probability of rolling a seven.

42) \_\_\_\_\_

- A) 0.5
- B) 0
- C) 0.1
- D) 1

43) A study of 1000 randomly selected flights of a major airline showed that 856 of the flights arrived on time. What is the probability of a flight arriving on time?

43) \_\_\_\_\_

- A)  $\frac{125}{18}$
- B)  $\frac{107}{125}$
- C)  $\frac{125}{107}$
- D)  $\frac{18}{125}$

44) If one card is drawn from a standard deck of 52 playing cards, what is the probability of drawing an ace?

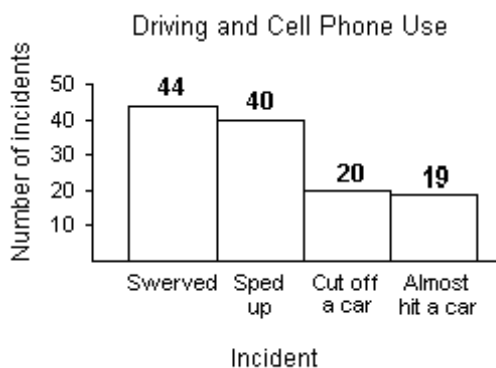
44) \_\_\_\_\_

- A)  $\frac{1}{2}$
- B)  $\frac{1}{4}$
- C)  $\frac{1}{13}$
- D)  $\frac{1}{52}$

- 45) If one card is drawn from a standard deck of 52 playing cards, what is the probability of drawing a red card? 45) \_\_\_\_\_  
 A)  $\frac{1}{2}$  B)  $\frac{1}{4}$  C)  $\frac{1}{13}$  D)  $\frac{1}{52}$
- 46) In a survey of college students, 840 said that they have cheated on an exam and 1795 said that they have not. If one college student is selected at random, find the probability that the student has cheated on an exam. 46) \_\_\_\_\_  
 A)  $\frac{168}{527}$  B)  $\frac{527}{168}$  C)  $\frac{359}{527}$  D)  $\frac{527}{359}$
- 47) A question has five multiple-choice answers. Find the probability of guessing an incorrect answer. 47) \_\_\_\_\_  
 A)  $\frac{1}{5}$  B)  $\frac{4}{5}$  C)  $\frac{3}{5}$  D)  $\frac{5}{2}$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 48) Use the following graph, which shows the types of incidents encountered with drivers using cell phones, to find the probability that a randomly chosen incident did not involve cutting off a car. Round your answer to three decimal places. 48) \_\_\_\_\_



MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 49) Find the probability of answering two true or false questions correctly if random guesses are made. 49) \_\_\_\_\_  
 A) 0.1 B) 0.25 C) 0.75 D) 0.5
- 50) A card is drawn from a standard deck of 52 playing cards. Find the probability that the card is an ace or a king. 50) \_\_\_\_\_  
 A)  $\frac{2}{13}$  B)  $\frac{1}{13}$  C)  $\frac{8}{13}$  D)  $\frac{4}{13}$

## Answer Key

Testname: ENTERING DE HONORS STATISTICS\_SUMMER PACKET - 2018

- 1) A population is the collection of *all* outcomes, responses, measurements, or counts that are of interest.. A sample is a subset of a population.
- 2) A sample would be used. It is usually impractical to obtain all the population data.
- 3) A
- 4) A
- 5) population: collection of all American households; sample: collection of 1212 American households surveyed
- 6) population: collection of all American households; sample: collection of 1348 American households surveyed
- 7) population: elementary school children; sample: collection of 2625 elementary school children surveyed.
- 8) It describes a statistic because the number \$130,000 is based on a subset of the population.
- 9) It describes a parameter because the \$44,000 is based on all the workers at the car manufacturer.
- 10) It describes a statistic because the number 1040 is based on a subset of the population.
- 11) A
- 12) B
- 13) B
- 14) B
- 15) In stratified sampling, members of the population are divided into two or more subsets, or strata, that share a similar characteristic. A sample is then randomly selected from each of the strata. A stratified sample has members from each segment of the population. In cluster sampling, the population is divided into naturally occurring subgroups, each having similar characteristics. All of the members in one or more (but not all) of the clusters are then selected. In a cluster sample, care must be taken to ensure that all clusters have similar characteristics.
- 16) A census is a count or measure of an entire population, while a sampling is a count or measure of part of a population. A census provides complete information but is often expensive, difficult, and time consuming to perform especially if the population is large. A sampling is less expensive and time consuming, however appropriate sampling techniques must be used to ensure that unbiased data are collected and that the sample is representative of the population. Even with the best sampling methods, sampling error can occur.
- 17) D
- 18) A
- 19) B
- 20) B
- 21) Key:  $0 \mid 4 = 4$

0	4 8
1	0 5
2	5
3	3 6 6
4	0 0 9
5	0
6	3 4 6

Most of these years he hit 36 or more home runs.

- 22) D
- 23) D
- 24) B
- 25) A
- 26) mean 94, median 95, mode 96
- 27) C
- 28)  $\mu$  represents a population mean and  $\bar{x}$  represents a sample mean.
- 29) No, the mean is not a good representation of the center. The mean score is 78, and 9 of the scores are better than this.
- 30) B
- 31) D

Answer Key

Testname: ENTERING DE HONORS STATISTICS\_SUMMER PACKET - 2018

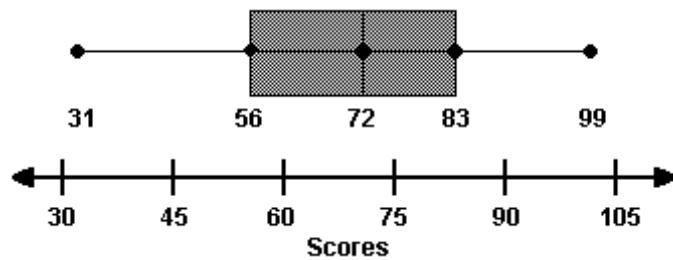
32) D

33) B

34) C

35) D

36)



37) D

38) C

39) D

40) B

41) D

42) B

43) B

44) C

45) A

46) A

47) B

48) 0.837

49) B

50) A