

Name _____ ID _____
Per _____

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

Determine whether the data are qualitative or quantitative.

- 1) the number of seats in a movie theater
A) quantitative B) qualitative 1) _____
- 2) the numbers on the shirts of a girl's soccer team
A) qualitative B) quantitative 2) _____

Identify the data set's level of measurement.

- 3) hair color of women on a high school tennis team
A) ordinal B) interval C) ratio D) nominal 3) _____
-
- 4) the annual salaries for all teachers in California
A) ordinal B) interval C) ratio D) nominal 4) _____
- 5) temperatures of 22 selected refrigerators
A) nominal B) interval C) ratio D) ordinal 5) _____
- 6) the ratings of a movie ranging from "poor" to "good" to "excellent"
A) nominal B) ratio C) interval D) ordinal 6) _____

Decide which method of data collection you would use to collect data for the study. Specify either observational study, experiment, simulation, or survey

- 7) A study where a drug was given to 57 patients and a placebo to another group of 57 patients to determine if the drug has an effect on a patient's illness
A) simulation B) survey
C) experiment D) observational study 7) _____
- 8) A study of the salaries of college professors in a particular state
A) observational study B) survey
C) simulation D) experiment 8) _____
- 9) A study where a political pollster wishes to determine if his candidate is leading in the polls
A) experiment B) survey
C) simulation D) observational study 9) _____
- 10) A study where you would like to determine the chance getting three girls in a family of three children
A) observational study B) survey
C) experiment D) simulation 10) _____

Identify the sampling technique used.

11) Every fifth person boarding a plane is searched thoroughly.

11) _____

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

12) Thirty-five sophomores, 35 juniors and 49 seniors are randomly selected from 230 sophomores, 280 juniors and 577 seniors at a certain high school.

12) _____

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

13) A researcher randomly selected 85 of the nation's middle schools and interviewed all of the teachers at each school.

13) _____

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

Use the given frequency distribution to find the

(a) class width.

(b) class midpoints of the first class.

(c) class boundaries of the first class.

14) Height (in inches)

14) _____

Class	Frequency, f
50 - 52	5
53 - 55	8
56 - 58	12
59 - 61	13
62 - 64	11

A) (a) 2

(b) 51.5

(c) 49.5-52.5

B) (a) 3

(b) 51

(c) 50-52

C) (a) 2

(b) 51.5

(c) 50-52

D) (a) 3

(b) 51

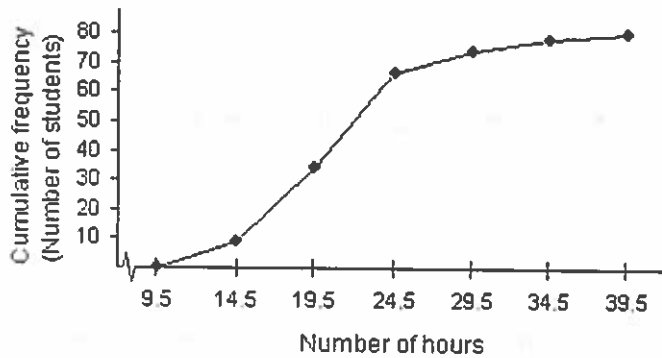
(c) 49.5-52.5

Provide an appropriate response.

15) Use the ogive below to approximate the number in the sample.

15) _____

Leisure Time of College Students



A) 341

B) 28

C) 100

D) 80

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

16) _____

Key : 11|2 = 11.2

11	0 2
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	0 5

A) max: 17.5; min: 11.0

B) max: 17.5; min: 11.2

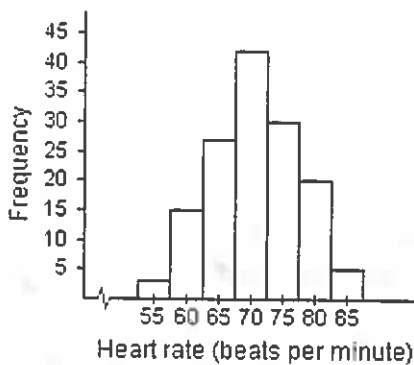
C) max: 175; min: 110

D) max: 17.0; min: 11.0

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

17) _____

Heart Rates of Adults



A) 55

B) 70

C) 30

D) 80

18) The scores of the top ten finishers in a recent golf tournament are listed below. Find the mean score. 18) _____

71 67 67 72 76 72 73 68 72 72

- A) 72 B) 67 C) 71 D) 68

19) The scores of the top ten finishers in a recent golf tournament are listed below. Find the mode score. 19) _____

71 67 67 72 76 72 73 68 72 72

- A) 67 B) 73 C) 76 D) 72

20) The scores of the top ten finishers in a recent golf tournament are listed below. Find the median score. 20) _____

67 67 68 71 72 72 72 72 73 76

- A) 72 B) 67 C) 73 D) 71

21) A student receives test scores of 62, 83, and 91. The student's final exam score is 88 and homework score is 76. Each test is worth 20% of the final grade, the final exam is 25% of the final grade, and the homework grade is 15% of the final grade. What is the student's mean score in the class? 21) _____

- A) 80.6 B) 85.6 C) 76.6 D) 90.6

Approximate the mean of the grouped data.

22) 22) _____

Miles (per day)	Frequency
1-2	22
3-4	30
5-6	3
7-8	28
9-10	5

- A) 5 B) 18 C) 4 D) 6

Provide an appropriate response.

23) Find the sample standard deviation. 23) _____

2 6 15 9 11 22 1 4 8 19

- A) 7.1 B) 6.3 C) 2.1 D) 6.8

24) Adult IQ scores 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 adults with scores between 70 and 130. 24) _____

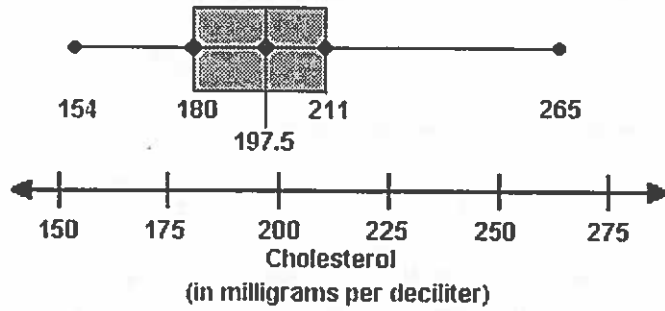
- A) 99.7% B) 95% C) 68% D) 100%

25) A competency test has scores with a mean of 82 and a standard deviation of 2. A histogram of the data shows that the distribution is normal. Between what two values do about 99.7% of the values lie? 25) _____

- A) Between 78 and 86 B) Between 74 and 90
C) Between 76 and 88 D) Between 80 and 84

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

26) _____



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

27) For the mathematics part of the SAT the mean is 514 with a standard deviation of 113, and for the mathematics part of the ACT the mean is 20.6 with a standard deviation of 5.1. Bob scores a 660 on the SAT and a 27 on the ACT. Use z-scores to determine on which test he performed better.

27) _____

- A) ACT
- B) SAT

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

28) _____

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

29) The distribution of blood types for 100 Americans is listed in the table. If one donor is selected at random, find the probability of selecting a person with blood type A+.

29) _____

Blood Type	O+	O-	A+	A-	B+	B-	AB+	AB-
Number	37	6	34	6	10	2	4	1

- A) 0.45
- B) 0.68
- C) 0.4
- D) 0.34

30) A group of students were asked if they carry a credit card. The responses are listed in the table.

30) _____

Class	Credit Card	Not a Credit Card	Total
	Carrier	Carrier	
Freshman	24	36	60
Sophomore	37	3	40
Total	61	39	100

If a student is selected at random, find the probability that he or she owns a credit card given that the student is a freshman. Round your answer to three decimal places.

- A) 0.400
- B) 0.240
- C) 0.600
- D) 0.393

31) You are dealt two cards successively without replacement from a standard deck of 52 playing cards. Find the probability that the first card is a two and the second card is a ten. Round your answer to three decimal places. 31) _____
 A) 0.994 B) 0.006 C) 0.500 D) 0.250

32) Find the probability of answering two true or false questions correctly if random guesses are made. Only one of the choices is correct. 32) _____
 A) 0.1 B) 0.5 C) 0.25 D) 0.75

33) Four students drive to school in the same car. The students claim they were late to school and missed a test because of a flat tire. On the makeup test, the instructor asks the students to identify the tire that went flat; front driver's side, front passenger's side, rear driver's side, or rear passenger's side. If the students didn't really have a flat tire and each randomly selects a tire, what is the probability that all four students select the same tire? 33) _____
 A) $\frac{1}{256}$ B) $\frac{1}{4}$ C) $\frac{1}{64}$ D) $\frac{1}{8}$

34) A card is drawn from a standard deck of 52 playing cards. Find the probability that the card is an ace or a king. 34) _____
 A) $\frac{1}{13}$ B) $\frac{8}{13}$ C) $\frac{4}{13}$ D) $\frac{2}{13}$

35) A card is drawn from a standard deck of 52 playing cards. Find the probability that the card is an ace or a heart. 35) _____
 A) $\frac{4}{13}$ B) $\frac{7}{52}$ C) $\frac{3}{13}$ D) $\frac{17}{52}$

36) The table lists the smoking habits of a group of college students. 36) _____

Sex	Non-smoker	Regular Smoker	Heavy Smoker	Total
Man	135	52	5	192
Woman	187	21	5	213
Total	322	73	10	405

If a student is chosen at random, find the probability of getting someone who is a man or a non-smoker. Round your answer to three decimal places.
 A) 0.936 B) 0.820 C) 0.948 D) 0.941

37) The table lists the smoking habits of a group of college students. 37) _____

Sex	Non-smoker	Regular Smoker	Heavy Smoker	Total
Man	135	46	5	186
Woman	187	21	11	219
Total	322	67	16	405

If a student is chosen at random, find the probability of getting someone who is a regular or heavy smoker. Round your answer to three decimal places.
 A) 0.205 B) 0.141 C) 0.687 D) 0.239

38) State whether the variable is discrete or continuous. 38) _____
 The number of cups of coffee sold in a cafeteria during lunch
 A) discrete B) continuous

39) State whether the variable is discrete or continuous. 39) _____
 The height of a player on a basketball team
 A) discrete B) continuous

40) The random variable x represents the number of cars per household in a town of 1000 households. 40) _____
 Find the probability of randomly selecting a household that has less than two cars.

Cars	Households
0	125
1	428
2	256
3	108
4	83

A) 0.809 B) 0.428 C) 0.553 D) 0.125

41) Determine the probability distribution's missing value. 41) _____
 The probability that a tutor will see 0, 1, 2, 3, or 4 students

x	0	1	2	3	4
$P(x)$	0.01	0.04	0.37	0.34	?

A) 0.76 B) -0.29 C) 0.24 D) 0.95

42) At a raffle, 10,000 tickets are sold at \$5 each for three prizes valued at \$4,800, \$1,200, and \$400. 42) _____
 What is the expected value of one ticket?
 A) \$4.36 B) \$0.64 C) -\$4.36 D) -\$0.64

43) A test consists of 90 multiple choice questions, each with five possible answers, only one of which is correct. Find the mean and the standard deviation of the number of correct answers. 43) _____
 A) mean: 45; standard deviation: 6.71 B) mean: 45; standard deviation: 3.79
 C) mean: 18; standard deviation: 3.79 D) mean: 18; standard deviation: 4.24

44) A test consists of 10 true or false questions. To pass the test a student must answer at least eight questions correctly. If the student guesses on each question, what is the probability that the student will pass the test? 44) _____
 A) 0.08 B) 0.20 C) 0.055 D) 0.8

45) In a recent survey, 66% of the community favored building a police substation in their neighborhood. If 14 citizens are chosen, find the probability that exactly 11 of them favor the building of the police substation. 45) _____
 A) 0.001 B) 0.786 C) 0.148 D) 0.660

46) Basketball player Chauncey Billups of the Detroit Pistons makes free throw shots 88% of the time. 46) _____
 Find the probability that he misses his first shot and makes the second.
 A) 0.0144 B) 0.1056 C) 0.50 D) 0.7744

- 47) A sales firm receives an average of four calls per hour on its toll-free number. For any given hour, find the probability that it will receive exactly nine calls. 47) _____
A) 0.0001 B) 146.3700 C) 0.0132 D) 0.0003
- 48) A local fire station receives an average of 0.55 rescue calls per day. Find the probability that on a randomly selected day, the fire station will receive fewer than two calls. 48) _____
A) 0.317 B) 0.087 C) 0.106 D) 0.894

Prob & Stat
Final Review

- | | |
|----------------|-----------------------|
| ① quantitative | ⑧ survey |
| ② qualitative | ⑨ observational study |
| ③ nominal | ⑩ simulation |
| ④ ratio | ⑪ systematic |
| ⑤ interval | ⑫ stratified |
| ⑥ ordinal | ⑬ cluster |
| ⑦ experiment | |
-

⑭ Class width = 3

$$\text{midpoint} = \frac{50+52}{2} = 51$$

class boundaries 49.5 - 52.5

⑮ $n = 80$

⑯ min : 11.0

max : 17.5

⑰ mean = 70

18) mean: $\frac{71 + 67 + 67 + 72 + 76 + 72 + 73 + 68 + 72 + 72}{10}$

= $\frac{710}{10} = 71$

19) mode = 72

20) median = 72

21) $62(0.20) + 83(0.20) + 91(0.20) + 88(0.25) + 76(0.15)$
 = 80.6

22) $\frac{1.5(22) + 3.5(30) + 5.5(3) + 7.5(28) + 9.5(5)}{22 + 30 + 3 + 28 + 5}$
 = 5

23)

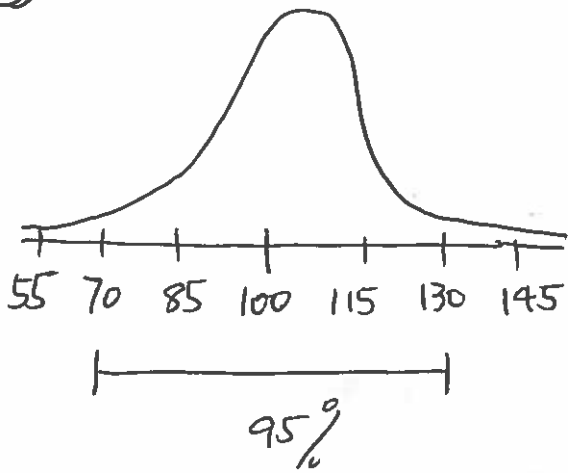
x	$(x - \bar{x})^2$
2	$(2 - 9.7)^2 = 59.29$
6	$(6 - 9.7)^2 = 13.69$
15	$(15 - 9.7)^2 = 28.09$
9	$(9 - 9.7)^2 = 0.49$
11	$(11 - 9.7)^2 = 1.69$
22	$(22 - 9.7)^2 = 151.29$
1	$(1 - 9.7)^2 = 75.69$
4	$(4 - 9.7)^2 = 32.49$
8	$(8 - 9.7)^2 = 2.89$
19	$(19 - 9.7)^2 = 86.49$

mean = $\frac{2 + 6 + 15 + \dots + 19}{10}$
 = 9.7

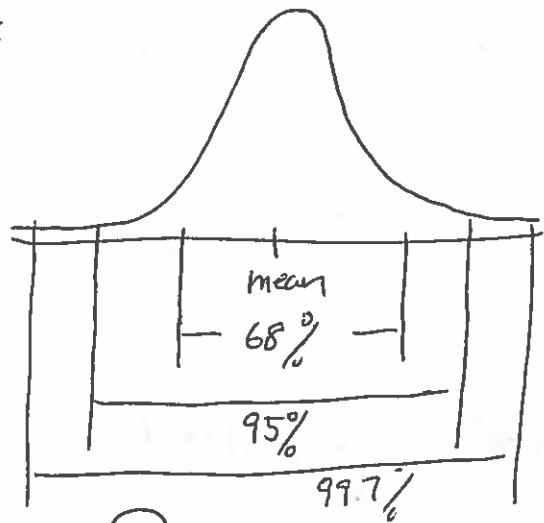
Variance = $\frac{59.29 + 13.69 + \dots + 86.49}{10 - 1}$
 = $\frac{452.1}{9} = 50.23$

Standard deviation
 = $\sqrt{50.23} \approx 7.1$

24



*



27

SAT

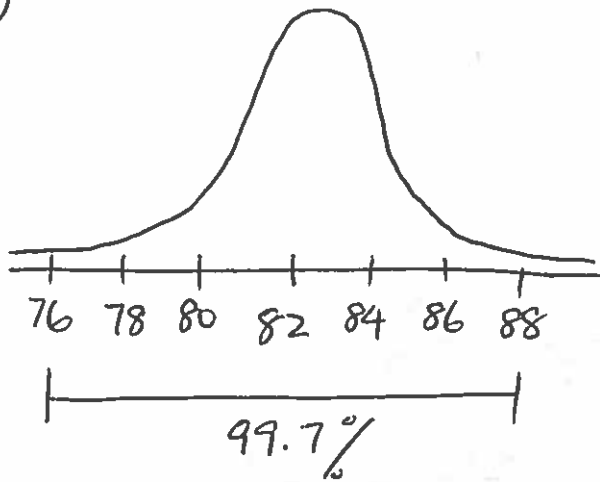
$$z = \frac{660 - 514}{113} = 1.29$$

ACT

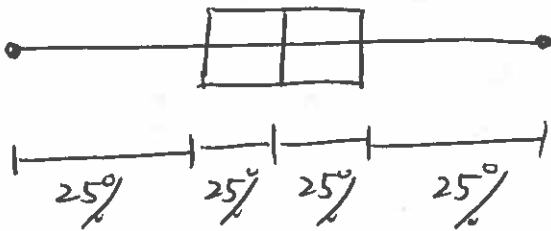
$$z = \frac{27 - 20.6}{5.1} = 1.25$$

SAT is better

25



26



50% in the middle

180 ~ 211

$$\textcircled{28} P(\text{ACE}) = \frac{4}{52} = \frac{1}{13}$$

$$\textcircled{29} P(A^+) = \frac{34}{100} = 0.34$$

$$\textcircled{30} P(\text{credit card} \mid \text{freshman}) = \frac{24}{60} = 0.4$$

$$\textcircled{31} P(\text{two and ten}) = \frac{4}{52} \cdot \frac{4}{51} = 0.006$$

$$\textcircled{32} \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4} = 0.25$$

$$\textcircled{33} \left(\frac{1}{4}\right)\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)\left(\frac{1}{4}\right) = \frac{1}{64}$$

$$\textcircled{34} P(\text{ACE or King}) = \frac{4}{52} + \frac{4}{52} = \frac{8}{52} = \frac{2}{13}$$

$$\textcircled{36} P(\text{man or non-smoker}) = \frac{192}{405} + \frac{322}{405} - \frac{135}{405} = 0.936$$

$$\textcircled{35} P(\text{ACE or heart}) = \frac{4}{52} + \frac{13}{52} - \frac{1}{52} = \frac{16}{52} = \frac{4}{13}$$

$$\textcircled{37} P(\text{regular or heavy}) = \frac{67}{405} + \frac{16}{405} = 0.205$$

$\textcircled{38}$ discrete

$\textcircled{39}$ continuous

$$\textcircled{40} P(\text{less than 2 cars}) = \frac{125 + 428}{1000} = 0.553$$

$$\textcircled{41} \quad P(4) = 1 - 0.01 - 0.04 - 0.37 - 0.34 = 0.24$$

$$\textcircled{42}$$

$x = \text{gain}$	4795	1195	395	-5
$P(x)$	$\frac{1}{10,000}$	$\frac{1}{10,000}$	$\frac{1}{10,000}$	$\frac{9997}{10,000}$

$$E(x) = 4795 \left(\frac{1}{10,000} \right) + 1195 \left(\frac{1}{10,000} \right) + 395 \left(\frac{1}{10,000} \right) - 5 \left(\frac{9997}{10,000} \right)$$

$$= -4.36$$

$$\textcircled{43} \quad \text{mean} = np = 90 \left(\frac{1}{5} \right) = 18$$

$$\text{standard deviation} = \sqrt{npq} = \sqrt{90 \left(\frac{1}{5} \right) \left(\frac{4}{5} \right)} = 3.79$$

$$\textcircled{44} \quad P(\text{at least } 8)$$

$$= P(x \geq 8) = P(8) = {}_{10}C_8 (0.5)^8 (0.5)^2$$

$$+ P(9) = {}_{10}C_9 (0.5)^9 (0.5)^1$$

$$+ P(10) = {}_{10}C_{10} (0.5)^{10} (0.5)^0$$

$$0.055$$

$$\textcircled{45} \quad P(x=11) = {}_{11}C_{14} (0.66)^{11} (0.34)^3$$

$$= 0.148$$

46) Geometric

$$P = (0.12)(0.88) = 0.1056$$

47) poisson

$$P(X=9) = \frac{\mu^x e^{-\mu}}{x!} = \frac{4^9 e^{-4}}{9!} = 0.0132$$

48) poisson

$$\begin{aligned} P(X < 2) &= P(X=0) + P(X=1) \\ &= \frac{(0.55)^0 e^{-0.55}}{0!} + \frac{(0.55)^1 e^{-0.55}}{1!} \\ &= 0.894 \end{aligned}$$