RETURN TO DISCUSSION SECTION NUMBER_____

STATISTICS 2023 NAME, IN INK Key

EXAM ONE SIGNATURE, IN INK_____

SPRING 1999 SS NUMBER, IN INK_____

Once this exam is graded and returned to you retain it for grade verification.

TRUE OR FALSE. Answer with a capital T or F. (3 points each)

T 1. Relative frequency is the frequency of the category with respect to the total number of observations.

T 2. The range of a data set is the number of units span by the data set.

T 3. If a data set is assumed to be mound-shaped then approximately 95% of the data set would lie inside of the interval of values which are within two standard deviations of the mean.

F 4. The mean, mode and median of a data set measure the amount of dispersion in the set.

T 5. If the z score is -2.5 for an individual data value from a population with mean of 14 and variance of 4 then the individual data value is equal to 9.

F 6. If a data set is mound shaped with a mean of 20 and a standard deviation of 5 then about 95% of the observations would be between 15 and 25.

T 7. The sample space of an experiment is comprised of all of the possible outcomes of the experiment.

T 8. The standard deviation tells the typical difference between the data values and the mean of the data set.

F 9. The marginal probability of an event is the probability of the event conditioned upon the occurrence of another event.

F 10. The mean of a data set can not be exactly the same number as the median of the data set.

STATE THE ANSWER. State the answer on the line given. (3 points each)

480 11. How many observations are in a data set if a category with 24 observations has a relative frequency of 0.05?

$$\frac{24}{n} = .05 \Rightarrow 24 = .05n \Rightarrow n = \frac{24}{.05} = 480$$

2.2 12. If from a data set with 165 observations the sum of squares is 1,253 and the sum is 363 what is the numerical value of the sample mean? State your answer with one digit past the decimal. $n = 165$, $\Sigma x^2 = 1,253$, $\Sigma x = 363$

$$\bar{x} = \frac{\Sigma x}{n} = \frac{363}{165} = 2.2$$

2.77 13. If from a data set with 165 observations the sum of squares is 1,253 and the sum is 363 what is the numerical value of the sample variance? Round your answer to two digits past the decimal. $n = 165$, $\Sigma x^2 = 1,253$, $\Sigma x = 363$

$$s^2 = \frac{\Sigma x^2 - \frac{(\Sigma x)^2}{n}}{n-1} = \frac{1,253 - \frac{(363)^2}{165}}{165-1} = \frac{454.4}{164} = 2.77073$$

2 14. If a data set with six hundred observations had one hundred ones, two hundred fifty twos, one hundred threes, one hundred fifty fours what is the numerical value of the median?

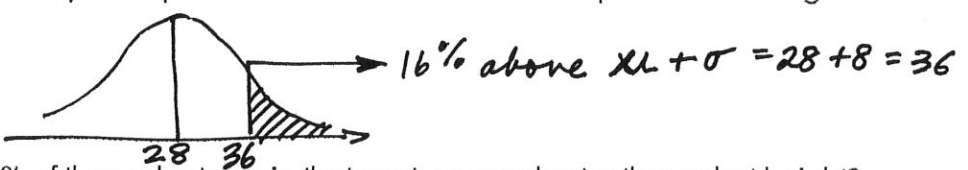
The median of 2 is located in the 300.5 position.

25% 15. If a data set with unknown shape has a mean of 272 and a standard deviation of 18 at most what percent of the observations could lie outside of the interval (236, 308)?

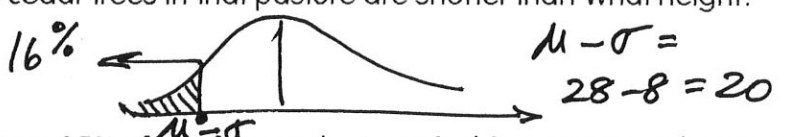
The interval (236, 308) is $\bar{x} \pm 2s$ to contains at least 75%, excludes at most 25%

The height of cedar trees on a specific northern Oklahoma pasture has a mound-shaped distribution with a mean of 28 feet and a standard deviation of 8 feet. Use this information to answer the remainder of the questions on this page. $M = 28$, $\sigma = 8$

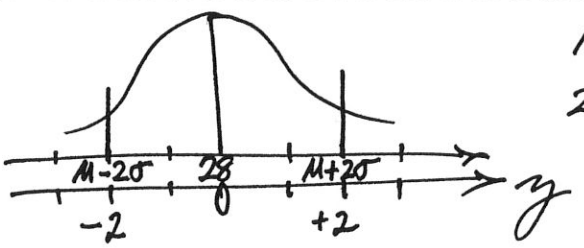
16% 16. Approximately what percent of the cedar trees in that pasture has heights greater than 36 feet?



20 17. About 16% of the cedar trees in that pasture are shorter than what height?



12, 44 18. The heights of about 95% of all of the cedar trees in this pasture are between what two values?



$M \pm 2\sigma$
$28 \pm 2(8)$
12, 44

STATE THE ANSWER. State the answer on the line given. (3 points each)

.8 19. The grade distribution of a certain algebra test has a mean of 65 with a standard deviation of 10. What is the z score associated with the exam grade of 73? State your answer with one digit past the decimal.

$$z = \frac{x-\mu}{\sigma} = \frac{73-65}{10} = \frac{8}{10} = .8$$

47 20. The grade distribution of a certain algebra test has a mean of 65 with a standard deviation of 10. What is the value of a student's exam grade if the z score associated with the grade is -1.8?

$$x_0 = \mu + z_0\sigma = 65 + (-1.8)10 = 47$$

A random sample of eight blue heron was chosen in Payne and Pawnee Counties of Oklahoma. The standing height was measured on each bird. The heights recorded in inches are stated below. Use this sample of standing heights of blue heron to answer the remainder of the questions on this page.

42.6, 49.2, 44.8, 42.1, 49.9, 51.7, 44.2, 43.2

16,997.63 21. What is the numerical value of the sum of the squares for the above sample?

$$\Sigma x^2 = 42.6^2 + \ldots + 43.2^2 = 16,997.63$$

367.7 22. What is the numerical value of the sum for the above sample?

$$\Sigma x = 42.6 + \ldots + 43.2 = 367.7$$

45.96 23. What is the numerical value of the mean of the above sample of heights? Round your answer to two digits past the decimal.

$$\bar{x} = \frac{\Sigma x}{n} = \frac{367.7}{8} = 45.9625$$

any # between 42, 44.8 44.5 24. What is a numerical value for the median of the above sample of heights?

42.1 42.6 43.2 44.2 44.8 49.2 49.9 51.7

44.5 or any # between 44.2 + 44.8.

13.89 or 13.88 25. What is the numerical value of the variance of the above sample of heights? Round your answer to two digits past the decimal.

$$S^2 = 13.888\,39286$$

3.7 26. What is the numerical value of the standard deviation of the above sample of heights? Round your answer to one digit past the decimal.

$$S = 3.72671\,3412$$

STATE THE ANSWER. State the answer on the line given. (3 points each)

.92 27. Of two computers on the same network one or the other functions properly 98% of the time. If one of the computers functions properly 96% of the time and the other computer functions properly 94% of the time what percent of the time are both computers functioning properly? $P(C_1) = .96$, $P(C_2) = .94$, $P(C_1 \cup C_2) = .98$

$P(C_1 \cap C_2) = .96 + .94 - .98 = .92$

.63 28. Suppose you have two friends, Mike and Becky. The probability that Mike will come to visit you is 0.70. If Mike comes to visit you the probability that Becky will come to visit you is 0.90. What is the probability that Mike and Becky will both come to visit you?

$P(M) = .70 \quad P(B|M) = .90$

$P(M \cap B) = P(B|M) \cdot P(M) = .9(.7) = .63$

Five hundred college students were questioned about whether or not they plan to attend summer school. What college their major is located in was also recorded. The results are shown in the following table. Use this table to answer the remainder of the questions on this page. Do not reduce fractional answers.

	GOING TO SUMMER SCHOOL?			
	Yes	No	Don't Know	
COLLEGE WHICH MAJOR IS IN				
College of Business	30	2	116	148
College of Agriculture	18	16	64	98
College of Arts & Science	4	22	228	254
	52	40	408	500

52/500 29. What is the probability of choosing a student who is planning to go to summer school?

30/148 30. If the one student chosen has a major in the College of Business what is the probability that the student is planning to go to summer school?

18/52 31. Given that a student who plans to go to summer school is chosen what is the probability that the student has a major in the College of Agriculture?

22/500 32. What is the probability that if one student is chosen that the student does not plan to go to summer school and has a major in the college of Arts & Sciences?

440/500 33. What is the probability that if one student is chosen that the student currently does not know if they want to go to summer school or has a major in the College of Business?

$408 + 148 - 116 = 440$