DISCUSSION SECTION TO RETURN EXAM_____

STATISTICS 2023 **NAME IN PRINT** Key

EXAM ONE **SIGNATURE IN INK**_____

SPRING 1998 **ID OR SS IN INK**_____

Retain this exam for grade verification after it is returned to you.
TRUE OR FALSE. Answer with a capital T or F. **(3 points each)**

F 1. A frequency bar graph and a relative frequency bar graph both generated from the same data would produce identical graphs that would have the same labeling on the vertical and the horizontal axes.

F 2. If the mean of a data set is greater than the median of the data set then the data set is probably symmetric.

T 3. If the range in a data set is 150 units then it is reasonable that the standard deviation may be close to 25 units.

F 4. The measures of dispersion include range, variance, standard deviation and relative frequency.

T 5. If a data set is mound shaped then approximately 5% of the data set is outside of an interval of values that are within two standard deviations of the mean.

F 6. If a data set with unknown shape has a mean of 165 and a standard deviation 15 then at least 75% of the data are inside of the interval (150, 180).

T 7. If two events are independent then the occurrence of one of the events does not affect the probability of the occurrence of the other event..

CALCULATION QUESTIONS. Write the answer on the line. **(3 points each)**
Assume that a data set had 7 observations which had the values: 11, 6, 8, 9, 15, 10, 18.

77 8. What is the numerical value of the sum of the observations?

951 9. What is the numerical value of the sum of the squares of the observations?

5,929 10. What is the numerical value of the square of the sum of the observations?

11 11. What is the numerical value of the mean of the data set listed above?

STATE THE ANSWER. Write the answer on the line. **(3 points each)**

2 12. A data set with 1,800 values contains 650 ones, 450 twos, 400 threes and 300 fours. What is the numerical value of the median for this data set?

4.5 13. If the sum of the values in a sample with 160 observations is 720 then what is the numerical value of the sample mean?

$$\bar{X} = \frac{\Sigma x}{n} = \frac{720}{160} = 4.5$$

9 14. If the sum of squares in a sample with 160 observations is 16,119 and the sum is 720 then what is the numerical value of the sample standard deviation?

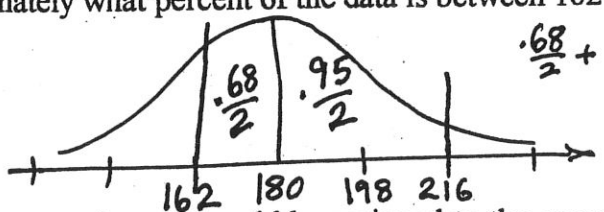
$$S = \sqrt{\frac{\Sigma x^2 - \frac{(\Sigma x)^2}{n}}{n-1}} = \sqrt{\frac{16{,}119 - \frac{(720)^2}{160}}{159}} = \sqrt{81} = 9$$

25% 15. A data set with unknown shape has a mean of 100 and a standard deviation of 24 units, at most what percent of the data would be above the value 148?

148 is 2S above $\bar{x}$, there may be at most 25% of the data above $\bar{x}+2s$.

81.5% 16. If a data set is mound shaped with a mean of 180 and a standard deviation of 18 then approximately what percent of the data is between 162 and 216?

$\frac{.68}{2} + \frac{.95}{2} = .815$



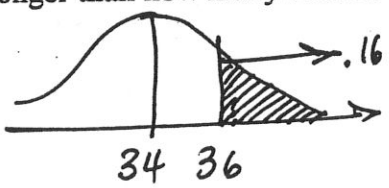
54 17. How many degrees would be assigned to the segment of a pie chart that represents a category in the data which has a relative frequency of 0.15?

degree for a segment w/ rel. freq = 0.15 is .15(360).

−1.7 18. If a data set has a mean of 128 and a standard deviation of 14 then what is the z score for the value 104.2?

$$z = \frac{x - M}{\sigma} = \frac{104.2 - 128}{14} = -1.7.$$

36 19. Assume the length of full-grown catfish is a mound-shaped variable with a mean of 34 inches and standard deviation of 2 inches. Based on this information, sixteen percent of full-grown catfish are longer than how many inches?



STATE THE ANSWER. Write the answer on the line. **(3 points each)**

The Oklahoma State University Basketball Team scored the following number of points in six games this season: 62, 69, 64, 95, 94, 88. Use this data to answer the next four questions.

78.67 20. What is the numerical value of the mean for this sample of basketball scores? Round your answer to two digits past the decimal.

$$\bar{X} = 78.\overline{6}$$

15.33 21. What is the numerical value of the standard deviation for the six basketball scores? Round your answer to two digits past the decimal.

$$S = \sqrt{\frac{\Sigma X^2 - \frac{(\Sigma X)^2}{n}}{n-1}} = 15.33188399$$

78.5 22. What is the numerical value of the median of the above basketball scores?

62, 64, 69, 88, 94, 95

median is any # between 69, 88.

33% 23. If the mean of this set of basketball scores is 80 and the standard deviation is 12 in what percent of the games did OSU actually score more points than one standard deviation above the mean?

2 of the 6 data points are > 92

The weekly profit of a small grocery store in Hollis, Oklahoma is mound shaped with a mean of $2,100 and a standard deviation of $250. Use this information to answer the remaining questions on this page.

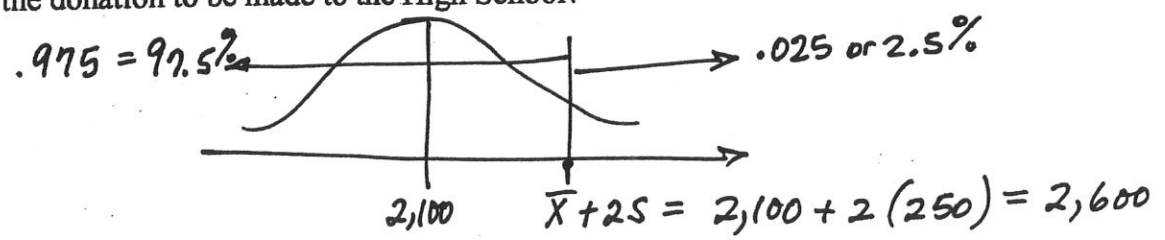
$2,850 24. Based on the information above, the highest weekly profit for this grocery store is approximately what value?

$$\bar{X} + 3S = 2,100 + 3(250) = 2,850$$

16% 25. Approximately what percent of the time will the weekly profit in this grocery store be less than $1,850?

16% of the data are below $\bar{X} - S = 2,100 - 250 = \$1,850$.

$2,600 26. The owner of this grocery store is going to make a $100 donation to the high school every week that the weekly profit from the grocery store is greater than the 97.5 percentile value of weekly profit. The weekly profit from the grocery store must be greater than what amount for the donation to be made to the High School?



PROBABILITY QUESTIONS. State the answer on the line. **(3 points each)**

.06 27. You have two internet service providers connected to your home computer but they do not function independently. Five percent of the time one of the providers does not work properly, two percent of the time the other provider does not work properly. Both of the providers are not working properly at the same time about one percent of the time. What is the probability that one or the other of the providers is not working properly? Do not round your answer. $P(A) = .05$, $P(B) = .02$, $P(A \cap B) = .01$

A = Provider 1 not working. B = provider 2 not working

$P(A \cup B) = P(A) + P(B) - P(A \cap B) = .05 + .02 - .01 = .06$

0.75 28. Forty percent of current credit card holders in the United States pay off their credit card bill in full each month. Twenty percent of current credit card holders own their own home. Fifteen percent of current credit card holders in the United States own their own homes and pay off their credit card bill in full each month. Based on this information, of the set of current credit card holders who own their own homes what is the probability that they pay off their credit card bill in full each month? Do not round your answer.

$P(Pay) = .4$, $P(own) = .2$, $P(Pay \cap own) = .15$

$P(PAY \mid own) = \frac{P(Pay \cap own)}{P(own)} = \frac{.15}{.2} = 0.75$

Four hundred students were questioned about whether they had ever used the OSU bus service and whether they commuted from outside of Stillwater or lived in Stillwater.

	Commute to Stillwater		
	YES	**NO**	
Used Bus Service			
YES	**42**	**128**	170
NO	**56**	**174**	230
	98	302	400

Do not reduce your fractional answers.

170/400 29. What is the probability that a randomly chosen student has used the bus service?

226/400 30. What is the probability that a randomly chosen student has used the bus service or commutes to Stillwater?

128/170 31. Given that a student has used the OSU bus service what is the probability that the student does not commute to Stillwater?

42/98 32. If a student commutes to Stillwater what is the probability that they have used the OSU bus service?

42/400 33. What is the probability that a randomly chosen student commutes to Stillwater and has used the OSU bus service?