NAME IN PRINT _____ Key _____

SIGNATURE IN INK_____

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

___T___ 1. A frequency bar graph and a relative frequency bar graph both generated from the same data would be the same graph, but with different labeling on the vertical axis.

___F___ 2. If the mean of a data set is greater than the mode of the data set, then the data set is probably left skewed.

___T___ 3. If the range in a mound-shaped data set is 1,680 units, then it is reasonable that the standard deviation is 280 units.

___F___ 4. The numerical measures of dispersion include range, variance, mean, and standard deviation.

___F___ 5. If a data set is mound-shaped then approximately 95% of the data set is within three standard deviations of the mean.

___T___ 6. If a data set with unknown shape has a mean of 156 and a standard deviation 27 then at most 25% of the data are outside of the interval (102, 210).

___F___ 7. The conditional probability of an event is the same as the marginal probability of the event when the event and the conditioned upon event are dependent.

CALCULATION QUESTIONS. Write the answer on the line. (3 points each)
Assume that a stock had closing values for 10 business days of:

4.7,   4.9,   5.3,   4.4,   4.2,   4.0,   3.6,   4.4,   4.1,   5.2.

___44.8___ 8. What is the numerical value of the sum of the observations?

$$\Sigma x = 4.7 + 4.9 + \ldots + 5.2$$

___203.36___ 9. What is the numerical value of the sum of the squares of the observations?

$$\Sigma x^2 = 4.7^2 + 4.9^2 + \ldots + 5.2^2$$

___2007.04___ 10. What is the numerical value of the square of the sum of the observations?

$$(\Sigma x)^2 = (44.8)^2 = 2007.04$$

___.295___ 11. What is the numerical value of the variance of the sample listed above?
Round your answer to three digits past the decimal.

$$S^2 = \frac{\Sigma x^2 - \frac{(\Sigma x)^2}{n}}{n-1} = \frac{203.36 - \frac{(44.8)^2}{10}}{9}$$

Eight small Oklahoma companies have had to lay off employees in the current economic slowdown. The number of employees laid off by each company is the following: Use this data for the questions on this page.   56,   32,   14,   18,   28,   34,   8,   12

_**25.25**_ 12. What is the mean number of employees laid off by these companies?

$$\overline{X} = \frac{\Sigma X}{n}$$

_**23**_ 13. What is the median number of employees laid off by these employees?

8   12   14   18   28   32   34   56

23

**right** 14. Based on comparing the mean and the median do you think that the sample represents a data set that is right skewed, left skewed, or symmetric?

mean > median ⟹ right skewed

_**.43**_ 15. What is the z score for the value of 32? Round your answer to two digits past the decimal.

$$z = \frac{X - \overline{X}}{s} = \frac{32 - 25.25}{15.70941483} = .42967864$$

_**62.5%**_ 16. What percent of the sample values are less than 30?

$$\frac{5}{8} = .625 = 62.5\%$$

_**.25**_ 17. If a histogram with categories of 0-5, 5-10, 10-15, 15-20, 20-25, 25-30, 30-35, 35-40, 40-45, 45-50, 50-55, and 55-60 was used to illustrate this data what would be the relative frequency of the category 10-15?

$$\frac{2}{8} = .25$$

_**18**_ 18. Which of the data values has a z score that is -0.46 when rounded to two digits past the decimal?

One of the data values.

$$z = \frac{X - \overline{X}}{s} = \frac{18 - 25.25}{15.7094} = -.4615 \doteq -.46.$$
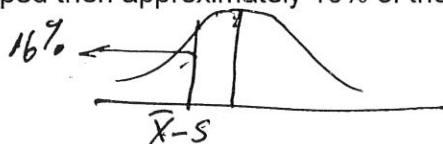
The daily return on a certain stock investment has a mean of $120 with a standard deviation of $60. Use this information to answer the questions on this page.
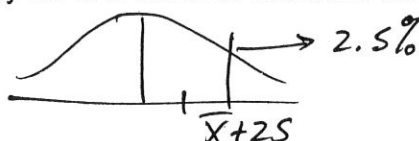
60 _____ 19. If the shape of the distribution of the daily return on the stock investment is assumed to be mound-shaped then approximately 16% of the time the daily return would be less than what amount?

16% ←

$\bar{X} - S = 120 - 60$

$\bar{X}-S$

240 _____ 20. If the shape of the distribution of the daily return on the stock investment is assumed to be mound-shaped only 2.5% of the time would the daily return on the stock exceed what amount?
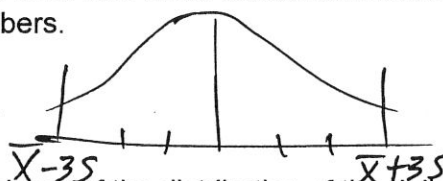
→ 2.5%

$\bar{X} + 2S =$
$120 + 2(60) = 240$

$\bar{X}+2S$

−60, 300 _____ 21. If the shape of the distribution of the daily return on the stock investment is assumed to be mound-shaped what interval of values contains almost all of the daily return values? State an interval with two numbers.
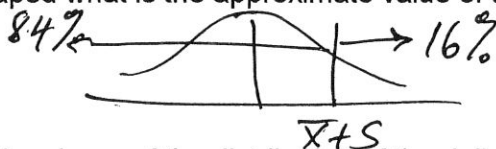
$\bar{X} \pm 3S$
$120 \pm 3(60)$
$(-60, 300)$

$\bar{X}-3S$ $\bar{X}+3S$

180 _____ 22. If the shape of the distribution of the daily return on the stock investment is assumed to be mound-shaped what is the approximate value of the 84th percentile of the distribution?
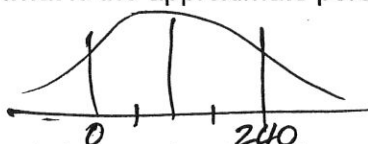
84% ← → 16%

$\bar{X} + S =$
$120 + 60 = 180$

$\bar{X}+S$

95% _____ 23. If the shape of the distribution of the daily return on the stock investment is assumed to be mound-shaped what is the approximate percent of daily returns that are between $0 and $240

0 and 240 are
$\bar{X} \pm 2S$ so 95%
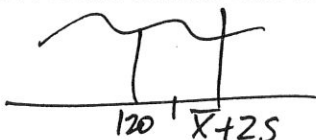
0   240

25% _____ 24. If nothing is known about the shape of the distribution of the daily return on the stock investment then at most what percent of the daily returns are less than $0?

at most 25%

0
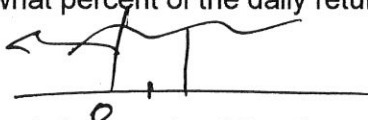
240 _____ 25. If nothing is known about the shape of the distribution of the daily return on the stock investment then at most 25% of the returns exceed what value?

$\bar{X} + 2S =$
$120 + 2(60) = 240$

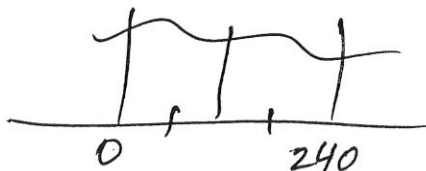120 $\bar{X}+2S$

0, 240 _____ 26. If nothing is known about the shape of the distribution of the daily return on the stock investment then what interval of values contains at least 75% of the daily returns?

at least 75%
$\bar{X} \pm 2S$
$120 \pm 2(60)$

0   240

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

_.0024_ 27. You have two internet service providers connected to your home computer that function independently. One provider has a failure rate of 0.04 and the other provider has a failure rate of 0.06, what is the probability that both of the internet service providers will fail? Do not round your answer.

$$P(F_1)=.04, \quad P(F_2)=.06 \qquad P(F_1 \cap F_2)= \underline{P(F_1) \cdot P(F_2)}$$
$$\text{due to indep-}$$

_.54_ 28. Oklahoma State University sells only to students a special sports package that contains tickets for three specific home football games. Sixty percent of all students purchase this special sports package. Forty-five percent of all students attend these three home football games. Given that a student does purchase this special sports package, the probability that the student will attend these three football games is 0.85. What is the probability that a student will purchase the special sports package or will attend these three football games? Do not round your answer.

$$P(Pkg)=.60, \quad P(attend\ 3)=.45 \quad P(attend\ 3\ |\ Pkg)= .85$$
$$P(Pkg\ \cup\ attend\ 3)= P(Pkg)+P(attend\ 3) - P(attend\ 3\ |\ Pkg) \cdot P(Pkg)$$

Four-hundred fifty students were questioned about whether they thought that the paper version of the O'Collegian should continue to be printed. The students were also asked if they typically read the on-line version of the O'Collegian newspaper and their age. The data resulted in the following table. Use it to answer the remaining questions on this page. Answer with a fraction, do not simplify, and do not state the answer as a decimal.

	In favor of continuing to print the O'Collegian on Paper?				
	Yes, continue to print on paper		No, do not continue to print on paper		
	Less than 21	21 or older	Less than 21	21 or older	
Reads O'Collegian on-line	38	35	118	68	259
Does not read O'Collegian on-line	42	78	41	30	191
	80	113	159	98	450

_193/450_ 29. What is the probability that a randomly chosen student is in favor of continuing to print the O'Collegian on paper?

$$\frac{80+113}{450} =$$

_80/450_ 30. What is the probability that a randomly chosen student is in favor of continuing to print the O'Collegian to paper and is less than 21 years of age?

_186/257_ 31. Given that a student does not think that the university should continue to print the O'Collegian on paper, what is the probability that the student reads the O'Collegian on-line?

$$P(reads\ on\ line\ |\ NOT\ cont\ to\ print) = \frac{118+68}{159+98}$$

_120/193_ 32. Assuming that a student is in favor of continuing to print the O'Collegian on paper, what is the probability that the student does not read the O'Collegian on-line?

$$P(does\ not\ read\ |\ cont\ to\ print) = \frac{42+78}{80+113}$$

_73/450_ 33. What is the probability that a randomly chosen student favors continuing to print the O'Collegian on paper and reads the O'Collegian on-line?

$$P(cont\ to\ print\ \cap\ reads\ online) = \frac{38+35}{450}$$