STATISTICS 2023 **NAME, PRINT IN INK** Key

EXAM ONE **SIGNATURE, IN INK** _____

Spring 2008 **CWID, 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)**

F 1. The mean, the 50th percentile and the 2nd quartile of the data set are always the same value for any data set.

F 2. The mean is less than the median and the mode is greater than the median when the data set is right skewed.

T 3. The complement of an event is the set of outcomes not included in the event.

F 4. If a sample of 50 observations results in a mean of 45 and a standard deviation of 12 then a data value of 62 has a z score of positive one.

T 5. The conditional probability of an event A conditioned upon the occurrence of another event B is equal to the marginal probability of event A only if events A and B are independent.

F 6. If a data set is mound shaped with a mean of 2100 and a standard deviation of 25 then about 68% of the observations would be between 2050 and 2150.

T 7. The probability of some event is a number between the values of 0 and 1, inclusive of the values 0 and 1, which represents the likelihood of the event.

STATE THE ANSWER. State the answer on the line given. **(3 points each)**
For the remaining questions on this page consider the following data. The changes in percent of a particular stock for eight trading days were the following:

-1.6, 2.8, -3.1, 0.8, 1.5, -1.8, -2.2, 0.4

-.4 8. What is the numerical value of the mean of the sample of daily changes for the stock? $\bar{x} = \frac{\sum x}{n} = \frac{-3.2}{8} = -0.4$

31.14 9. What is the numerical value of the sum of squares for the sample of daily changes for the stock? $\sum x^2 = -1.6^2 + 2.8^2 + \ldots + .4^2 = 31.14$

4.27 10. What is the numerical value of the sample variance for the sample of daily changes for the stock? Round your answer to two digits past the decimal.

$s^2 = 4.2657 \Rightarrow 4.27$

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

161 11. If there are 2300 observations in a data set how many observations are in a certain category that has relative frequency of 0.07?

$.07(2300) =$

8,876 12. If a data set with 634 observations has a mean of 14, what is the sum of the data?

$\bar{X} = 14 = \frac{\Sigma x}{634} \Rightarrow \Sigma x = 14(634) = 8,876$

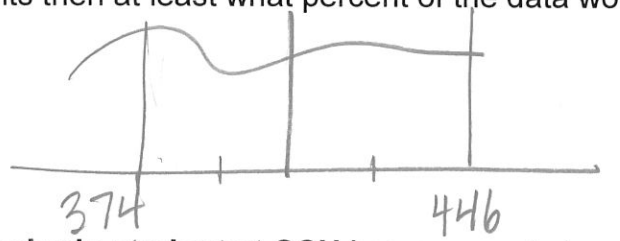
54 13. If the position of the median in a data set is 27.5, how many observations are in the data set?

If $\frac{n+1}{2} = 27.5 \Rightarrow n+1 = 55 \Rightarrow n = 54$

2,401 14. If a data set has a sample standard deviation of 49 what is the numerical value of the sample variance?

$s^2 = (s)^2 = (49)^2 = 2,401$

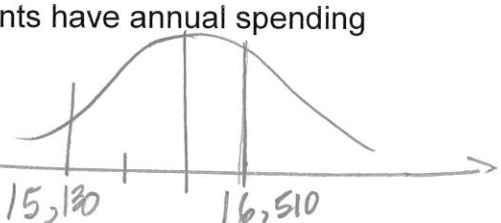
75% 15. If a data set with unknown shape has a mean of 410 units and a standard deviation of 18 units then at least what percent of the data would fall into the interval (374, 446)?



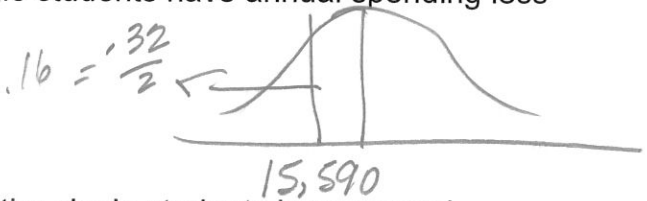
The annual spending of a single student at OSU has a mound-shaped distribution with a mean of \$16,050 and a standard deviation of \$460. Use this information to answer the remainder of the questions on this page.

81.5% 16. Approximately what percent of single students have annual spending between \$15,130 and \$16,510?

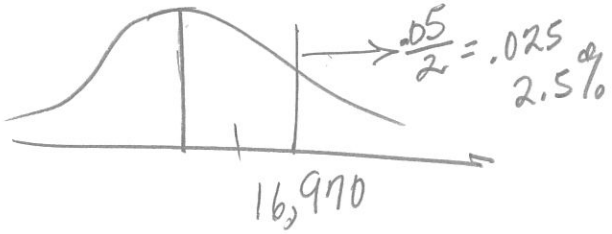
$\frac{.95}{2} + \frac{.68}{2} = .815 = 81.5\%$



15,590 17. About 0.16 or 16% of the single students have annual spending less than how many dollars?



2.5% 18. What approximate percent of the single students have annual spending more than \$16,970?



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

_____ 19. Suppose a sample is drawn from a distribution with mean 75 and standard deviation 15. What is the z-score corresponding to an individual value of 72? State your answer with one digit past the decimal.

$-.2$

$$z_{x=72} = \frac{72-75}{15} = \frac{-3}{15} = -.2$$

_____ 20. Suppose a sample is drawn from a distribution with mean 75 and standard deviation 15. What is the individual value corresponding to the z-score of 1.24? State your answer with one digit past the decimal.

93.6

$$X_{z=1.24} = \bar{X} + zs = 75 + (1.24)15 = 93.6$$

Answer question 21-26 with the following data

Audio podcasts that are available on the internet are mpeg level 3 files, called mp3. The file size is approximately 1MB for each 2 minutes of talk audio. Listed below are seven randomly chosen individual podcasts and the associated file size in megabits.

Podcast	**file size in MB**
The Classic Tales Podcast	22.8MB
NPR Hourly News Summary	2.6MB
BBC Global News	9.2MB
Future Tense Tech News	3.4MB
Travel with Rick Steves	28.5MB
Washington Week PBS	14.6MB
Science Talk	12.9MB

2.6 3.4 9.2 12.9 14.6 22.8 28.5

13.4

_____ 21. What is the numerical value of the mean for the above file sizes?

$\bar{X} = 13.42857 \Rightarrow 13.4$

12.9

_____ 22. What is the numerical value of the median for the above files sizes?

no mode

_____ 23. What is the numerical value of the mode for the above files sizes?

no mode

1,814.62

_____ 24. What is the numerical value of the sum of the squares for the above file sizes?

$\sum x^2 = 22.8^2 + \ldots + 12.9^2 = 1,814.62$

8,836

_____ 25. What is the numerical value of the square of the sum for the above file sizes?

$(\sum x)^2 = (22.8 + \ldots + 12.9)^2 = (94)^2 = 8,836$

9.6

_____ 26. What is the numerical value for the standard deviation of the above file sizes? Round your answer to one digit past the decimal.

$$s = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}} = \sqrt{\frac{1,814.62 - \frac{(94)^2}{7}}{6}} = 9.594 \Rightarrow 9.6$$

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

.67 27. Thirty-five percent of the employees of a company are managers; eighty percent of the employees have MBA degrees. Of the employees with MBA degrees sixty percent of them are managers. What is the probability that a randomly chosen employee has an MBA degree or is a manger? State your answer with two digits past the decimal. $P(\text{manag}) = .35$, $P(\text{MBA}) = .8$ $P(\text{manag} \mid \text{MBA}) = .6$

$P(\text{MBA} \cup \text{manag}) = .35 + .8 - .6(.8) = .67$

.7 28. Sixty-three percent of all new movies are produced in both HD-DVD and BlueRay formats. Ninety percent of all new movies are produced in BlueRay format. Assuming that a movie is produced in BlueRay format what is the probability that it is also produced in HD-DVD format? State your answer with one digit past the decimal.

$P(HD \cap BR) = .63$, $P(BR) = .9$

$P(HD \mid BR) = .63/.9 = .7$

Snow-boarding is a popular winter sport for many Americans. In a survey at a major state university 400 students were questioned whether they were interested in a snow-boarding trip during winter break. The sex and marital status of each student in the survey was recorded. The data appear below. Do not reduce fractional answers. State all of your answers as ratio fractions. Do not state decimal fraction answers.

	Interested in the Trip		Not Interested in the Trip		
	Male	**Female**	**Male**	**Female**	
Single	72	73	25	50	220
Married	78	47	20	35	180
	150	120	45	85	

270

400 29. What is the probability that a randomly selected person is interested in the trip?

72

97 30. Assume a person is randomly selected from all single males, what is the probability that he will be interested in the trip?

78

400 31. What is the probability that a randomly selected person is a married male and interested in the trip?

$P(\text{married male} \cap \text{Interested}) = \frac{78}{400}$

98

180 32. If a married person is selected, what is the probability that the person is male?

$P(\text{male} \mid \text{married}) = \frac{98}{180}$

250

400 33. What is the probability of randomly selecting a person who is female or is not interested in the trip?

$P(\text{female} \cup \text{Not interested}) = \frac{205 + 130 - 85}{400}$