

Name Key  
 (Please ALSO write your name on the back of the last page.)

**Ag 400 - Quiz 1**  
 Fall 2006

- A. Mudville has 80 small businesses located within the town limits. The following data were compiled concerning the number of paid employees each of these businesses had last month. (The business owner and unpaid family workers were not included.)

<u>Number of Paid Employees</u>		<u>Number of Businesses</u>	$x f$	$cf$	$x^2 f$
None	0	10	0	10	0
1-2	1.5	40	60	50	90
3-5	4	20	80	70	320
6-8	7	10	70	80	490
		80	210		900

- (5) 1. Calculate the mean number of employees per business using these data.

$$\bar{X} = \frac{210}{80} = 2.625$$

- (5) 2. What is the median for the above distribution?

$$Md \text{ position} = 40.5 \quad Md \text{ class } 1-2$$

$$Md = .5 + \left( \frac{40 - 10}{40} \right) 2 = .5 + 1.5 = 2.0$$

- (6) 3. Calculate the variance in number of paid employees in a business.

$$s^2 = \frac{900 - \frac{(210)^2}{80}}{80} = 4.359375 = 4.36$$

(20) 4. Indicate whether each of the following statements is true (T) or false in terms of these data. If any part of a statement is untrue, it should be marked false (F). Add comments, if you wish, to clarify your answers.

- F a. The statistical unit in this problem is a paid employee. *a. business*
- F b. The variable is number of businesses. *# of employees*
- T c. The above distribution is skewed to the right.
- F d. The mode for the above distribution is 40. *1.5*
- F e. The above distribution is presented as what we have called "semi-grouped" data since the first class interval has only one value (zero) and hence is not an "interval".
- T f. The variable here is measured by an interval scale.
- F g. Since 10 businesses have no paid employees, they can be deleted from the distribution without loss of data.
- F h. The range for the above distribution is 30.
- T i. The standard deviation is less than the range for the above distribution. Standard deviations are never larger than the range for the same distribution.
- T j. Half of the businesses in the sample have 1 or 2 employees.

- (24) B. Suppose that a random sample of paid employees from these 80 businesses was drawn and interviewed. Some worked part-time (<30 hours a week); others worked full-time (30 hrs. a week or more). The following table was compiled.

Employee's Gender	Employee Status	
	Part-time	Full-time
	—number of employees—	
Female	32 <sup>64%</sup>	18 <sup>36%</sup>
Male	48 <sup>40%</sup>	72 <sup>60%</sup>
	80	90
		170

Indicate whether each of the following statements is true (T) or false (F) in terms of these data. If any part of a statement is untrue, it should be marked false (F). Add comments, if you wish, to clarify your answers.

- F 1. The statistical unit is a small business <sup>an employee</sup> in Mudville.
- T 2. The independent variable, gender, is measured by a two-category nominal scale.
- F 3. Males are more likely than females to work part-time. <sup>♂ 40%</sup> <sub>♀ 64%</sub>
- F 4. The relationship between gender and employment status (Part-time vs. Full-time) as shown in this table can be described as follows:
- Part-time workers are more likely to be males than females, and full-time workers were less likely than females than males.
- T 5. The above table is called a contingency table. It presents data describing the relationship between two nominally scaled variables.
- F 6. The ratio of full-time to part-time workers is 8:9 or .889 <sup>9:8 or 1.125</sup>
- F 7. The Sex Ratio for the above data equals 220. <sup>240</sup> <sub>120:50</sub> <sub>240:100</sub>
- T 8. 64% of the female employees work part-time while just 40% of the male employees work part-time in the table presented above.
- F 9. The mean number employees for this table equals 42.5

- F 10. The relationship between gender and employment status shown in the above table can be described as follows:

There are more male employees in the sample than female employees, and more full-time than part-time workers.

- T 11. Thirty-six percent of the female employees work full-time; 20% of the full-time employees are females.

- F 12. The mode for the above table is 72.

- (20) C. Suppose you have an SPSS data file that contains data from a study of the effects of two different kinds of pesticides on insect infestation of orchid plants. A total of 50 orchid plants were studied, with 25 being treated with Pesticide A and 25 being treated with Pesticide B. The data set has the following Coding Instructions.

ID Identification Number of Orchid Plant

PEST Pesticide Treatment Used  
1 Pesticide A  
2 Pesticide B

BLOSBUG = Number of insects found on orchid blossom  
Missing data = -9

STEMBUG = Number of insects found on the stem of the plant  
Missing data = -9

LEAFBUG = Number of insects found on the plant leaves  
Missing data = -9

Indicate whether each of the statements is true (T) or false (F) in terms of these data. If any part of a statement is untrue it should be marked false (F). Add comments, if you wish, to clarify your answers.

- F 1. There are 5 x 50 or 250 lines in the data file.
- I 2. There are at least five (5) columns in the data file.
- F 3. To calculate the total number of insects found on the blossom, stem, and leaves combined for *each* orchid plant, you could run a FREQUENCIES analysis on BLOSBUG, STEMBUG, and LEAFBUG and request STATISTICS = SUM.
- T 4. The mean number of insects per plant found on the blossoms of the 25 plants in the sample treated with Pesticide A could be calculated by using SELECT IF . . . to obtain those cases where PEST=1 and running a FREQUENCIES analysis on BLOSBUG, asking for STATISTICS=mean.

F 5. If you specify that (-9) is the missing value code for BLOSBUG in the Data Editor (Variable View), those cases with (-9) on BLOSBUG will be deleted from the data file so that you will never have to use them.

T 6. If you correctly recode BLOSBUG into a new variable (BLOSBUG2) with the following categories, but do not include information on how (-9) is to be recoded, cases with a (-9) on BLOSBUG will be blank (SYSMIS) in BLOSBUG2.

BLOSBUG code	BLOSBUG2 code
0-5	1
6-10	2
11 & over	3

T 7. When you make a new variable using COMPUTE, the new variable appears to the right of the last variable in the Data Editor/Data View.

T 8. RECODE and COMPUTE are data modification commands that allow you to form new variables from existing variables in the data file. COMPUTE can also add new variables that are unrelated to variables existing in the data file.

F 9. The following SPSS commands are Task Commands that generate statistical output:

FREQUENCIES, COMPUTE, RECODE

T 10. Files with the extension .sav are SPSS data files. Those with an .spo extension are SPSS output files.

(20) D. The attached output was obtained using the data set described in C above. Indicate whether each of the following statements is true (T) or false (F) in terms of these data. If any part of a statement is untrue, the statement should be marked false (F). Add comments, if you wish, to clarify your answers.

- T 1. Overall, there were more insects on the blossoms of plants treated with Pesticide A than there were on plants treated with Pesticide B.
- T 2. Separate analyses was carried out for plants treated with Pesticide A and Pesticide B using SPLIT FILE and FREQUENCIES.
- T 3. The distribution of BLOSBUG for plants treated with Pesticide A is symmetrical, while the same distribution for plants treated with Pesticide B is skewed to the left.
- F 4. The Kurtosis index for both of these distributions indicates that the distributions are more peaked than a Normal Curve. *platykurtic*
- F 5. In the data reported here, the mode is less than or equal to the median. The Mode is never greater than the median for the same distribution.
- F 6. In both the distribution of BLOSBUG for plants treated with Pesticide A and the distribution of BLOSBUG for plants treated with PESTICIDE B, the standard deviations are less than the corresponding variances. Standard deviations are never greater than their corresponding variances.  $s^2 = .25$   $s = .5$
- T 7. For both of the distributions given on this output, the standard deviations are positive numbers. Standard deviations are never negative values.
- F 8. There is greater dispersion in the variable BLOSBUG for plants treated with Pesticide B than for those treated with Pesticide A.
- T 9. The mode for the distribution of BLOSBUG for plants treated with Pesticide A is 6; the mode for the distribution of plants treated with Pesticide B is 4.
- F 10. The mean score reported on the output for BLOSBUG for plants treated with Pesticide B is distorted because there are two cases that have Missing Value codes of -9 and these cases will reduce the calculated mean score.

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FREQUENCIES
  VARIABLES=BLOSBUG
  /STATISTICS=STDDEV MEAN MEDIAN SKEWNESS SESKEW KURTOSIS SEKURT
  /ORDER= ANALYSIS .

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## Frequencies

[DataSet1] Y:\Willits\AAATeaching\AAATeaching\Ag400\Quizzes400\Q1\_06.sav

### PEST = 1

#### Statistics<sup>a</sup>

BLOSBUG

N	Valid	25
	Missing	0
Mean		6.00
Median		6.00
Std. Deviation		1.936
Skewness		.000
Std. Error of Skewness		.464
Kurtosis		-.332
Std. Error of Kurtosis		.902

a. PEST = 1 PESTICIDE A

#### BLOSBUG<sup>a</sup>

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 2	1	4.0	4.0	4.0
3	1	4.0	4.0	8.0
4	4	16.0	16.0	24.0
5	4	16.0	16.0	40.0
6	5	20.0	20.0	60.0
7	4	16.0	16.0	76.0
8	4	16.0	16.0	92.0
9	1	4.0	4.0	96.0
10	1	4.0	4.0	100.0
Total	25	100.0	100.0	

a. PEST = 1 PESTICIDE A

# PEST = 2

## Statistics<sup>a</sup>

BLOSBUG

N	Valid	23
	Missing	2
Mean		4.78
Median		5.00
Std. Deviation		1.858
Skewness		-.212
Std. Error of Skewness		.481
Kurtosis		-.649
Std. Error of Kurtosis		.935

a. PEST = 2 PESTICIDE B

## BLOSBUG<sup>a</sup>

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	4.0	4.3	4.3
	2	2	8.0	8.7	13.0
	3	2	8.0	8.7	21.7
	4	6	24.0	26.1	47.8
	5	3	12.0	13.0	60.9
	6	4	16.0	17.4	78.3
	7	4	16.0	17.4	95.7
	8	1	4.0	4.3	100.0
	Total	23	92.0	100.0	
Missing	-9	2	8.0		
Total		25	100.0		

a. PEST = 2 PESTICIDE B