ECONOMICS 261
STATISTICAL METHODS
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EXAM 1
SPRING SEMESTER 2002
SOLUTIONS

Part I: Concept questions.

1. Inferential statistics.

2. Stem and leaf display.

3. Contingency table.

4. Skewness.

5. Correlation coefficient.

Part II: Problem questions.

6. Relative frequency distribution problem.

Ordered data set:

X: 10, 10, 15, 15, 16, 20, 20, 22, 24, 25,

28, 28, 30, 35, 40, 40, 40, 40, 42, 49

(a) Relative frequency distribution:

Class Interval: Hours Worked per Week	Relative Frequency: Percent of Students
1-10	10 (2 ÷ 20)
11-20	25 (5 ÷ 20)
21-30	30 (6 ÷ 20)
31-40	25 (5 ÷ 20)
41-50	10 (2 ÷ 20)

(b) The sample size, n = 20; the center of the distribution is in the 21-30 hours worked interval; the class intervals have a range from 1 to 50 hours while the range in the data is from 10 to 49 hours; the distribution is symmetric.

7. Weighted mean problem.

$$\bar{X}_W = \frac{\Sigma XW}{\Sigma W} = \frac{24{,}000}{1{,}000} = \$24.00$$

Work:

Time	Price (X)	Quantity (W)	XW
August	$30.00	300	9,000
November	20.00	500	10,000
January	25.00	200	5,000
		$\Sigma W = 1{,}000$	$\Sigma XW = 24{,}000$

8. Sample data set problem.

(a) Arithmetic mean: $\bar{X} = \frac{\Sigma X}{n} = \frac{76}{8} = 9.5$ complaints

(b) $\Sigma(X-\bar{X})^2 = 112$ complaints squared

(c) $S = \sqrt{\frac{\Sigma(X-\bar{X})^2}{n-1}} = \sqrt{\frac{112}{7}} = \sqrt{16} = 4.00$ complaints

(d) $CV = S/\bar{X}\ (100) = \frac{4}{9.5}\ (100) = 42.11$ percent

(e) $Z(X=6) = \frac{X-\bar{X}}{S} = \frac{6-9.5}{4} = -0.875$ standard deviations

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Work:

X	$(X-\bar{X})$	$(X-\bar{X})^2$
6	-3.5	12.25
6	-3.5	12.25
7	-2.5	6.25
8	-1.5	2.25
9	-0.5	0.25
10	0.5	0.25
12	2.5	6.25
18	8.5	72.25

$\Sigma X = 76$ $\Sigma(X - \bar{X}) = 0.0$ $\Sigma(X - \bar{X})^2 = 112.00$

$n = 8$

9. Empirical rule problem.

Given: Normal distribution

$\bar{X} = 88$ percent

$S^2 = 4$ percent $\rightarrow S = 2$ percent

By the empirical rule: $\bar{X} \pm 1S \rightarrow 68\%$

$88 \pm (1)(2)$

88 ± 2

$88 - 2 = 86$

$88 + 2 = 90$

Answer: The room occupancy rate at the Bellagio Hotel for 68 percent of the days would have been between 86 percent and 90 percent.

Part III: Output interpretation questions (with reference to the Excel Descriptive Statistics Output).

10. The variable, Gen, questions.

    (a) $\overline{X} = 0.517$

    (b) Since this is a 0-1 dummy variable, X gives the percent of 1s in the sample; thus, women comprise 51.7 percent of this sample while men make up the remaining 48.3 percent of the sample.

11. The variable, Job, suggests the following about the distribution of work for the sample of UNLV students:

    (a) The sample size: n = 116

    (b) Central tendency: The median and mean student in this sample works about 21.5 hours per week while the modal student does not work.

    (c) Variation: The number of hours worked per week among the students in this sample ranges from 0 to 48 hours; the standard deviation suggests that the typical student's work hours deviates from the mean by some 13.3 hours.

    (d) Symmetry: While the mean and median are fairly close to one another at about 21.5 hours per week, the mode is 0 hours. This suggests that this distribution is asymmetric and probably not a normal distribution.

Part IV: Optional extra credit question on the movie, *A Beautiful Mind*.

12. Charles Herman was the prodigal roommate and companion that existed only in John Forbes Nash's schizophrenic mind.