

NAME:

1. [6] TRUE/FALSE: Circle T in each of the following cases if the statement is *always* true. Otherwise, circle F. Let f be a function, and x , y , and z be positive real numbers with $z \neq 0$.

T F If x is an observation from a distribution that has mean μ and standard deviation $\frac{\sigma}{\sqrt{n}}$, the standardized value of x is $z = \frac{x-\mu}{\sigma}$

T F Normal curves are completely described by their mean and standard deviation.

T F There exists a data set with a standard deviation equal to -1.

T F The mean is more sensitive to outliers than the median.

T F 50% of the data lies between Q_1 and Q_3

T F Approximately 95% of the area below a Normal curve lies within two standard deviations of the mean.

Show your work for the following problems. The correct answer with no supporting work will receive NO credit (this includes multiple choice questions).

2. [] Determine if the following are observational studies or experiments. If classified as experiments further specify if they are uncontrolled, controlled, or a matched pair study.

8.1 pg 192, 8.4 pg 194, 8.17 pg 206, 8.29 pg 208, 9.16 pg 228, 9.17 pg 228, 9.22 pg 228, 9.26 pg 229

3. The following is data on the average tuition and fees charged by public four-year colleges and universities for 1976 to 2005 academic years. Because almost any variable measured in dollars increases over time due to inflation, the values are given in “constant dollars.” adjusted to have the same buying power that a dollar had in 2005.

| Year | Tuition | Year | Tuition | Year | Tuition |
|------|---------|------|---------|------|---------|
| 1988 | \$2,551 | 1994 | \$3,523 | 2000 | \$3,935 |
| 1989 | \$2,617 | 1995 | \$3,564 | 2001 | \$4,140 |
| 1990 | \$2,791 | 1996 | \$3,668 | 2002 | \$4,408 |
| 1991 | \$2,987 | 1997 | \$3,768 | 2003 | \$4,890 |
| 1992 | \$3,208 | 1998 | \$3,869 | 2004 | \$5,239 |
| 1993 | \$3,396 | 1999 | \$3,894 | 2005 | \$5,491 |

- (a) Make a time plot of the average tuition and fees.

- (b) Make a histogram that displays the distribution of average tuition rates.

- (c) Make a stem plot to display the distribution of average tuition rates.

4. The following IQ scores are from 20 randomly chosen 7th-grade girls:
105 103 114 100 104 89 102 3 114 114 108 130 74 112 107 128 118 96 112 72
- Find the mean and median.
 - Find the five number summary.
 - Draw a box plot of the data.
 - What percentage of student have IQ above 100.
 - Calculate the standard deviation.
 - Which is a better description for the center and spread of the data: the five number summary of the mean and standard deviation? Why?

5. Suppose the scores on a final exam are normally distributed with a mean of 72 and standard deviation of 9.8.

- Draw the appropriate density curve.

- If I sample 20,000 students for some strange reason *about* how many should I expect to have a scores less then 70?

- What is the probability of student that scoring above 80?

- What is the probability that a student received a B on the exam (assume scores between 80 and 90 receive a B).

- If the bottom 10% of students who took the exam will fail the course, what is the lowest mark a student can have on this exam and still pass the class?

6. [] Explain the Central Limit Theorem in your own words. Be exact and say exactly what you mean.

7. [] Explain *carefully* what a confidence interval of level C is.

8. The population of scores of 10 students on an exam is:

| | | | | | | | | | | |
|---------|----|----|----|----|----|----|----|----|----|----|
| Student | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Score | 82 | 62 | 80 | 58 | 72 | 73 | 65 | 66 | 74 | 62 |

(a) Use the digits in row 116 of Table B to create a sample distribution where the SRS are of size 4? You need only plot 5 \bar{x} 's.

(b) Why would anyone ever want to use a sample distribution when it is so much harder to plot than the population's distribution?