**MULTIPLE CHOICE.**  Write the letter corresponding to the _best_ answer.

___ 1.  At Podunk University, otherwise known as PU, the scores on the English final are approximately normally distributed, with a mean of 76 and a standard deviation of 12.  The scores on the French final are also approximately normally distributed, with a mean of 78 and a standard deviation of 6.  A student scored 84 on the English final and 81 on the French final.  Relative to the students in each respective class, in which subject did this student do better?

   A)  The student did better in English.
   B)  The student did better in French
   C)  The student did equally well in each course.
   D)  There is no basis for comparison, since the subjects are different from each other and are in different departments.
   E)  There is not enough information for comparison, because the number of students in each class is not known.

___ 2.  Suppose each employee in a company receives a 10% raise for next year (each employee's salary is multiplied by 1.10).  The standard deviation of the salaries for the employees will
   A)  be multiplied by 10%        B)  be multiplied by 1.10        C)  increase by $110        D)  be unchanged

___ 3.  If only the largest value of a data set has 30 added to it, which of the following is _**false?**_

   A)   The interquartile range increases        D)  The range increases
   B)   The mean increases                       E)  The standard deviation increases
   C)   The median stays the same

___ 4.  Which of the following summaries is/are changed by adding 50 to each data value?

   I)  the mean                II)  the range                III)  the variance

   A) I only        B) II only        C) III only        D) I and II        E) I and III        H) I, II, and III

___ 5.  The true mean GPA for all McNeil Seniors in 2008 was 3.412.  A random sample of these Seniors had mean GPA 3.430.  Which is a true statement?

   A) 3.412 is a statistic; $\bar{x}$ = 3.412        D) 3.430 is a statistic; $\bar{x}$ = 3.43
   B) 3.412 is a statistic; $\mu$ = 3.412        E) 3.430 is a statistic; $\mu$ = 3.43
   C) 3.412 is a statistic; $p$ = 3.412        H) 3.430 is a statistic; $p$ = 3.43

___ 6.  What is true of the data whose distribution is shown?

   I.  The distribution is skewed to the right.
   II.  The mean is probably smaller than the median.
   III.  We should summarize with mean and standard deviation.
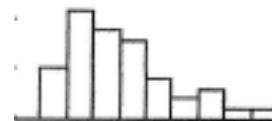
   A) I only            B) II only            C) III only        D) I and III        E) I,                                    II, and III

___ 7.  Suppose that a Normal model describes the cholesterol level (mg/dL) of adult American women and that a recently tested woman had a z-score of 2.4.  This means that

   A)  her cholesterol level was 2.4 mg/dL
   B)  her cholesterol level varied with a standard deviation of 2.4
   C)  her cholesterol level was 2.4 mg/dL higher than the average cholesterol level
   D)  her cholesterol level was 2.4 standard deviations higher than the average cholesterol level
   E)  her cholesterol level was 2.4 times that of average cholesterol levels

___ 8.  The ages of people attending the opening show of a new movie are summarized in the cumulative relative frequency graph (ogive) shown.  Which of the following statements is/are true?
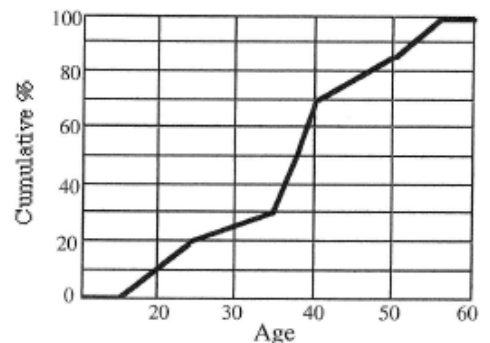
   I.   The median age of people attending this movie is about 38.
   II.  About 70% of the people attending this movie are have an age of at least 40 (age 40 or older).
   III. The IQR of ages of people attending this movie is about 13 or 14.

   A) I only        B) II only        C) III only        D) I and II
   E) I and III        H)  I, II, and III

9. A teacher is teaching two AP Statistics classes. On the final exam, the 20 students in the first class had a mean score of 92 while the 25 students in the second class had a mean score of only 83. If the teacher combines the classes, what will the overall mean final exam score be?

A) 87      B) 87.5      C) 88      D) 85
E) There is insufficient information to answer this question.

10. A teacher is teaching two AP Calculus classes. On the final exam, the 20 students in the first class had a median score of 92 while the 25 students in the second class had a median score of only 83. If the teacher combines the classes, what will the overall median final exam score be?

A) 87      B) 87.5      C) 88      D) 85
E) There is insufficient information to answer this question.

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11. You learn that your company is sending you and several other employees to staff a new office in China. While there, everyone will earn the equivalent of their current salary, converted to Chinese currency at the rate of 8 yuans per dollar. In addition, everyone will earn a weekly foreign living allowance of 200 yuans. For example, since you are earning $1000 per week, your weekly salary in China will be 1000(8) + 200 = 8200 yuans.

Shown are some summary statistics describing the current weekly salaries of this group being sent overseas. Fill in the table to show what these statistics will be for the salaries you all will earn while in China.

| Statistic | in U.S. | in China |
|---|---|---|
| Minimum Salary | $400 | |
| Standard Deviation | $250 | |
| Median | $750 | |
| IQR | $300 | |

12. Three statistics classes all took the same exam, and their distributions of scores are shown in the histograms:
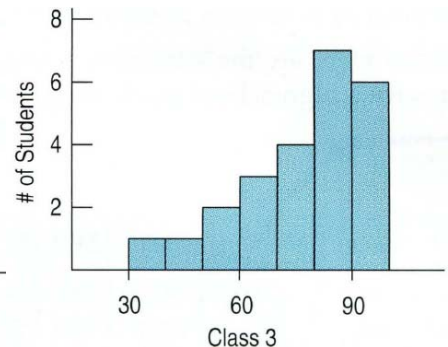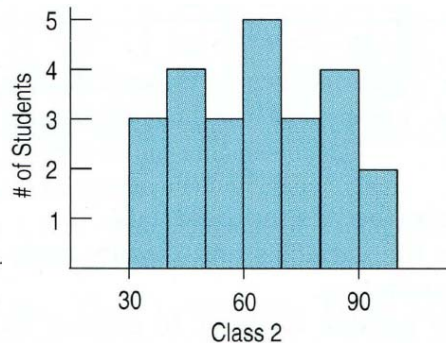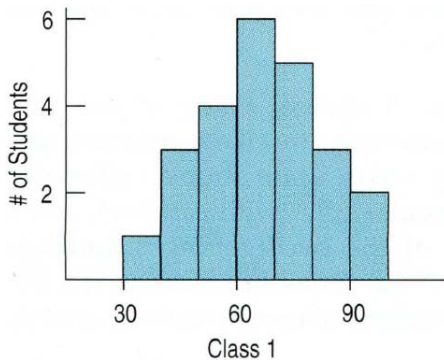


a) Which class has the highest median score?

b) For which class are the mean and median most different? Which of the two is higher for that class, the mean or the median? Explain.

c) Which class had the smallest standard deviation? *(remember: standard deviation is the typical distance from the mean… you can almost think of it as the "average" distance from the mean)*

d) The distribution of scores for class 1 appears to be unimodal and roughly symmetric (therefore, it may be appropriate to approximate this distribution by using the normal model). Which of the following would be a reasonable estimate for the standard deviation of scores in class 1? *Hint: Think about the empirical rule.*
a) 5.1      b) 11      c) 35      d) 70      e) 65

e) **Based on your answer to part (d)**, what would be a reasonable estimate for the variance of the distribution of scores for class 1? *Remember: variance = (standard deviation)$^2$*

13. The following data on x = savings rate (in percent) for a sample of 26 Southern California financial institutions appeared in the Los Angeles Times. The 4 lowest and 4 highest values are listed:

2.15     2.20     2.20     2.22          2.43     2.55     2.79     2.85

All 26 values entered into a computer and the computer results are:

| N | MEAN | MEDIAN | TRMEAN* | STDEV | Q1 | Q3 |
|---|------|--------|---------|-------|----|----|
| 26 | 2.346 | 2.28 | 2.303 | 0.1903 | 2.25 | 2.33 |

*Note: TRMEAN is the trimmed mean where 10% of the highest rates and 10% of the lowest rates have been removed from the data set and the mean found of the remaining data.*

a) Based on the statistics in the computer printout above, in which direction is this distribution likely to be skewed?

b) List the 5 number summary. (Label each value in the list. Example: median: ____)

c) Construct a box plot for the savings rates. SHOW YOUR TEST FOR OUTLIERS.

14. Costs for standard veterinary services at a local animal hospital follow a roughly Normal model with a mean of $80 and a standard deviation of $20. **Sketch and label the normal model for the costs of veterinarian services.**

    *Use the empirical rule to answer these questions.*

    a) In what interval would you expect the middle 95% of the costs?          _____

    b) *Approximately* what percent of these costs are more than $100?          _____

    c) *Approximately* what percent of the costs are between $20 and $140?          _____

15. Suppose a Normal model describes the fuel efficiency of cars currently registered in Texas. The mean is 24 mpg with a standard deviation of 6 mpg. (DRAW AND COMMUNICATE!)

    a) What percent of all cars in Texas get less than 30 mpg?

    b) What percent of all Texas cars get more than 20 mpg?

    c) What percent of all cars in Texas get between 20 and 30 mpg?

    d) Describe the fuel efficiency of the worst 20% of all cars in Texas.

16. AP Comic Design students at East Podunk High School and West Podunk High School are competing to see which school does better on the last major exam before Spring Break. The teachers for at both schools decide to give the same exam to their students at each school (each school has only one class period of AP Comic Design), and the results of their test scores are summarized in the parallel boxplots below:



AP Comic Design test scores
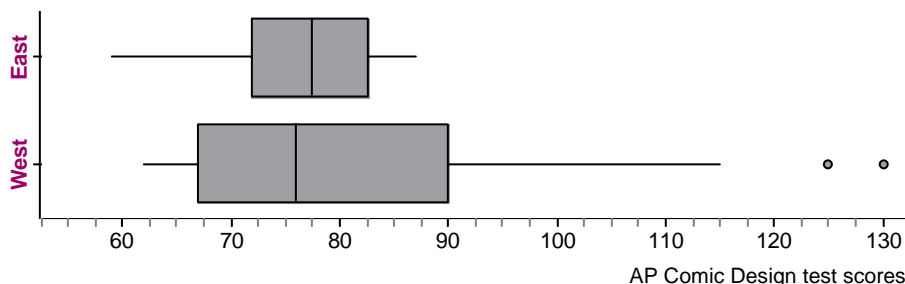
a) Which of the two classes had the higher proportion of students that passed* the test? Explain your answer.
   *(the lowest passing score at both high schools is a 70)

b) Which of the two classes appears to have the higher mean test score? Explain your answer.
   (Hint: Start by comparing the medians of the two distributions. Based on the shapes of the boxplots, where would you estimate the mean of each distribution to be located? Make sure you explain your thinking in detail!)