LIBERAL ARTS MATH I       STATISTICS 52 NAME _____
   Show all work on this test or on separate paper.
      Calculators.   SHOW ALL WORK.   CIRCLE ANSWERS.

In 1-3, find the a) mean, b) median, and c) mode:

   1.   6, 12, 6, 20


(2ea)


   2.   90, 80, 80, 96, 96, 58

(2ea)


   3.   90, 80, 75, 96, 14

(2ea)


In 4-5, find the standard deviation for a population
      given the following samples.

   4.   7              5.   18
        4                   30
(6ea)   9                   43
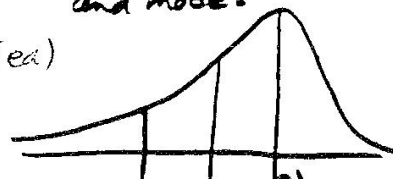        8                   20
        2                   24
                            27


6. For normal distributions,
   a) approximately ____ % are above the mean.
   b) approximately ____ % are within 1 s.d. of mean.
(ea) c) approximately ____ % are within 2 s.d. of mean.

7. Label: mean, median and mode:

(1ea)

8. Use a z-table to find the percent of the total area under the normal curve between the given z values.

   a) $z = 0$     $z = 2.3$      b) $z = -2.1$   $z = 2.5$

   c) $z = 1.4$    $z = 2.4$

9. A set of test scores are normally distributed with mean 200 and standard deviation 30. Find the z value for each score

   a) 176        b) 266      c) 161      d) 215

10. In the previous exercise, what percent of the test scores were

    a) between 176 and 200.      b) less than 266

    c) more than 266        d) between 176 and 215

11. High jumpers have a mean height of 6' with standard dev. of 6". Broad jumpers have a mean distance of 14' with standard dev. of 1'. which is better, relatively speaking: a 7' high jump or a 15.5' broad jump?

*MULTIPLE CHOICE*

*In 12-13,*

| Hours Worked per Week | Percent of Employees |
|---|---|
| 1–10 | 11 |
| 11–20 | 23 |
| 21–30 | 28 |
| 31–40 | 38 |

12. What percent of employees worked less than 21 hours/week?

   A. 23%  B. 28%  C. 34%  D. 66%

13. What interval contains the mode of the number of hours worked?

   A. 1-10  B. 11-20  C. 21-30  D. 31-40

*In 14-15,* job performance ratings have been scaled so that the rating listed below correspond to the indicated percentile ranks. Five is the best rating that can be given and 0 is the worst.

| Rating | Percentile Rank |
|---|---|
| 5 | 99 |
| 4 | 95 |
| 3 | 79 |
| 2 | 37 |
| 1 | 17 |
| 0 | 05 |

14. What percent of the employees received ratings between 2 and 4?

   A. 37%  B. 58%  C. 79%  D. 211%

15 Seventy-nine percent of the employees received ratings below which number?

   A. 1   B. 2   C. 3   D. 4

16. A city council would like to obtain the opinion of its citizens about the operation of its garbage collection service. Which procedure would be the most appropriate for obtaining a statistically unbiased sample?

   A.  Distribute a questionnaire in the city newspaper for residents to complete and mail in.

   B.  Select by blind drawing several geographic regions of the city and use the same method to select a sample of people within those regions to survey.

   C.  Select every tenth name from the telephone directory.

   D.  Have the persons attending a city council meeting write their names on slips of paper and drop them in a container; then choose a sample from the container to survey.

17. The graph below represents the ages of a random selection of people who caught a particular virus in 1993. Select the statement that is true about the distribution of ages.
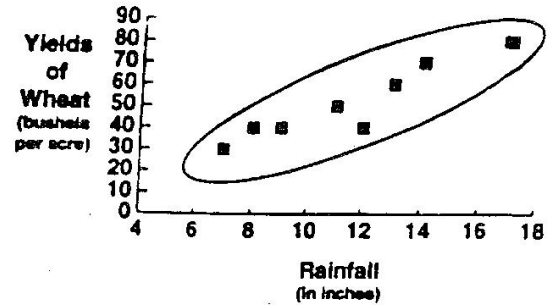
**Frequency**
(number of people)



12  17  22  27  32  37  42
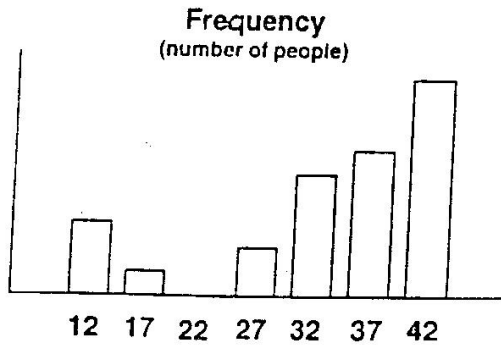
A. The mode is greater than the mean.

B. The mode and the mean are the same.

C. The median is greater than the mode.

D. The median and the mode are the same.

18. The following plot depicts the rainfall in inches and the yields of wheat in bushels per acre.



Yields of Wheat (bushels per acre)

Rainfall (in inches)

Which of the following best describes the relationship between the amount of rainfall and yields of wheat

A. There is no apparent association between rainfall and wheat yield.

B. An increase in rainfall caused an increase in wheat yield.

C. There is a positive association between rainfall and wheat yield.

D. There is a negative association between rainfall and wheat yield.

19  In a mathematics class, half the students scored 85 on an achievement test. Most of the remaining students scored 75 except for a few students who scored 20. Which of the following statements is true about the distribution of scores?

A. The mean and mode are the same.
B. The mean and median are same.
C. The mean is less than median.
D. The mean is greater than median.

LIBERAL ARTS MATH I Exam Statistics S2 Solutions

1. mean = 11
   median = 9
   Mode = 6

2. mean = $83.\overline{3}$
   median = 85
   mode = 80 and 96

3. mean = 71
   median = 80
   mode = None.

4. mean = 6
   Sum of squares = 34
   s.d. = $\sqrt{\frac{34}{4}} = \sqrt{8.5}$
   = 2.92

5. mean = 27
   Sum of squares = 404
   s.d. = $\sqrt{\frac{404}{5}} = \sqrt{80.8}$
   = 8.99

6a) 50%
 b) 68%
 c) 95%
 d) 99%

7a) mean
 b) median
 c) mode

8a) $z = 0$    $z = 2.3$
    $A = 0$    $A = .489$
    $A = .489 - 0 = $ 48.9%

 b) $z = -2.1$    $z = 2.5$
    $A = .482$    $A = .494$
    $A = .494 - (-.482)$
    $= .494 + .482$
    $= .976 \sim$ 97.6%

 c) $z = 1.4$    $z = 2.4$
    $A = .419$    $A = .492$
    $A = .492 - .419$
    $= .073 = $ 7.3%

9. $z = \frac{score - mean}{S.D.}$

 a) $z = \frac{176 - 200}{30} = \frac{24}{30}$
    $=$ .8

 b) $z = \frac{266 - 200}{30} = \frac{66}{30}$
    $=$ 2.2

 c) $z = \frac{161 - 200}{30} = \frac{-39}{30}$
    $=$ 1.3

 d) $z = \frac{215 - 200}{30} = \frac{15}{30}$
    0.5

10a) 176        200
    $z = .8$    $z = 0$
    $A = .288$  $A = 0$
    $A = .288 = $ 28.8%

 b) Less than 266
    $z = 2.2$
    $A = .486$
    $A = .500 + .486$
    $= .986 = $ 98.6%

 c) More than 266
    $A = 100\% - 98.6\%$
    $= $ 1.4%

 d) 176        215
    $z = .8$    $z = .5$
    $A = .288$  $A = .192$
    $A = .288 + .192$
    $= .480 = $ 48.0%

11. High        Broad
   mean = 6'    mean = 14'
   S.D = .5'    S.D = 1'
   $z = \frac{7 - 6}{.5}$    $z = \frac{15.5 - 14}{1}$
   $= 2$ S.D.    $= 1.5$ S.D.
   High jump is better, since

12.  11%
    + 23%
    34% (C)

13. mode = 31-40 (D)

14. 95 - 37 = 58% (B)

15. 3 (C)

16. (B)

17. Mode = 42
    Mean is less
    (A)

18. Association (correlation) does not prove cause + effect

19. mode = 85
    median = $\frac{85 + 75}{2} = 80$