

SHOW ALL WORK ON THIS TEST OR SEPARATE PAPER. Justify all answers.  
CALCULATORS ARE ALLOWED, but explain your work.

1. Given the numbers: 7, 12, 16, 7, 8

- a) find the mean      b) find the median      c) find the mode.

(3ea)

2. Given the numbers: 60, 40, 62, 40, 100, 100

- a) find the mean      b) find the median      c) find the mode.

(3ea)

3. Given the numbers: 72, 17, 84, 50, 24, 56, 9, 48

- a) find the mean      b) find the median      c) find the mode.

(3ea)

4. Given the frequency distribution,

<u>Score</u>	<u>Frequency</u>
100	4
96	6
90	1
70	4
60	1
40	4

find a) the mean,      b) the median,      c) the mode.

(2ea)

In 5 - 6, find the standard deviation of the following sets of numbers.

- |       |    |    |    |
|-------|----|----|----|
| 5.    | 7  | 6. | 57 |
|       | 12 |    | 62 |
|       | 16 |    | 66 |
| (5ea) | 7  |    | 57 |
|       | 8  |    | 58 |

In 7 - 8, find the standard deviation of a population of which the given numbers are a sample.

- |       |    |    |     |
|-------|----|----|-----|
| 7.    | 7  | 8. | 150 |
|       | 12 |    | 12  |
|       | 16 |    | 356 |
| (5ea) | 9  |    | 48  |
|       |    |    | 88  |
|       |    |    | 6   |

SHOW YOUR WORK:

9. A set of scores is normally distributed with mean 80 and standard deviation 5.

- (1ea)
- a) What percent of scores are below 85? \_\_\_\_\_
  - b) What percent of scores are between 70 and 90? \_\_\_\_\_
  - c) What percent of scores are above 85? \_\_\_\_\_
  - d) What percent of scores are below 70? \_\_\_\_\_
  - e) What percent of scores are above 70? \_\_\_\_\_
  - f) What percent of scores are between 65 and 85? \_\_\_\_\_

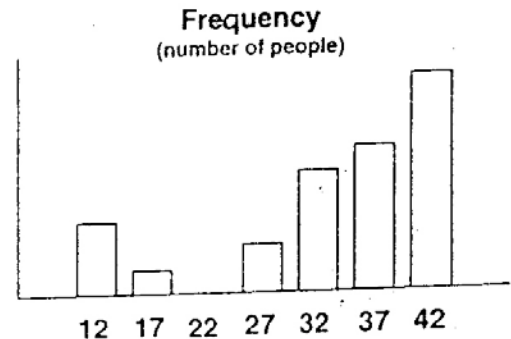
10. The life expectancy for a brand of batteries is normally distributed with mean 3 years and standard deviation 6 months.

- a) About two-thirds of the batteries will last between \_\_\_\_\_ and \_\_\_\_\_ years.
- b) About 95% of the batteries will last between \_\_\_\_\_ and \_\_\_\_\_ years.
- (1ea) c) What percent of the batteries can be expected to go bad before 2 years? \_\_\_\_\_
- d) What percent of the batteries should last longer than 4 years? \_\_\_\_\_
- e) What percent of the batteries will last between 3 and 4 years? \_\_\_\_\_

MULTIPLE CHOICE: (3ea)

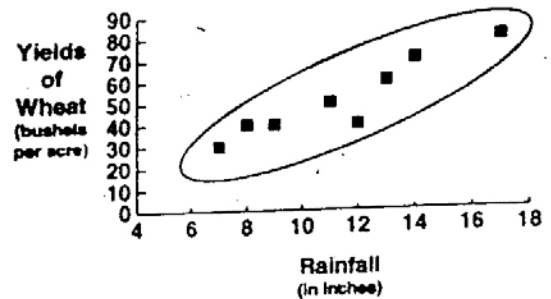
11. The graph below represents the ages of a random selection of people who caught a particular virus in 1993. Select the statement that is true about the distribution of ages.

- (3ea) 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.



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

- A. There is no apparent association between rainfall and yield.  
B. An increase in rainfall caused an increase in yield.  
C. There is a positive association between rainfall and yield.  
D. There is a negative association between rainfall and yield.



13. A survey is needed to learn more about the study habits among the students at a certain community college. Which procedure would be the most appropriate for selecting a statistically unbiased sample?
- A. Systematically survey the first one hundred students from a list of all students.
- B. Select students by blind drawing from those who are eating at the cafeteria on a certain Tuesday.
- C. Select students by blind drawing from the freshman and the sophomore class.
- D. Select students by blind drawing from each club on campus.

14. Scores on a graduate school entrance exam have been scaled so that the scores listed in the table correspond to the indicated percentile ranks in the table at the right. What percentage of the students who took the exam scored between 330 and 390?

Score	Percentile Rank
480	99
450	89
420	73
390	50
360	27
330	11
300	1

- A. 88    B. 61    C. 39    D. 27

- In 15- 16, the table gives the distribution of number of visits per year to a doctor's office by a group of families.

Visits	Proportion of families
0	0.08
1	0.23
2	0.21
3	0.25
4	0.13
5	0.10

15. What is the median number of visits to a doctor's office?

- A. 3    B. 2.5    C. 2.42    D. 2

16. What is the mean number of visits?

- A. 3    B. 2.5    C. 2.42    D. 2

17. In a particular lake, the average bass is 12 inches with standard deviation 2.5 inches. The average trout is 3 pounds with standard deviation 0.5 pound. Relatively speaking, which is the better catch, a 16 inch bass or a 4 pound trout? Calculate the z-value for each, and explain your answer.

(6)

18. A set of tires has a life expectancy that is normally distributed with a mean of 50,000 miles and standard deviation 10,000 miles. Use a Z-table to determine (SHOW ALL WORK):

a) what percent of the tires will last between 50,000 and 55,000?

b) what percent will last more than 55,000 miles?

c) what percent will last less than 32,000 miles?

d) what percent will last between 32,000 and 55,000 miles?

e) what percent will last between 32,000 and 45,000 miles?

(2ea)

# Statistics EXAM EE Solutions

- 1a) 10      2a) 67      3a) 45  
 A 8      A) 61      A) 49  
 c) 7      c) 40 and 100      c) None

5.  $7-10 = -3$     9    6.  $57-60 = -3$   
 $12-10 = 2$     4     $62-60 = 2$   
 $16-10 = 6$     36     $66-60 = 6$   
 $7-10 = -3$     9     $57-60 = -3$   
 $8-10 = -2$     4     $58-60 = -2$

$\frac{5 \overline{)150}}{10 \text{ mean}}$        $\frac{5 \overline{)62}}{12.4}$        $\frac{5 \overline{)300}}{60}$

$\sigma = \sqrt{124} = 3.5$

Simeca #5  
 $\sigma = 3.5$

4.  $100 \times 4 = 400$     c) Mode  
 $96 \times 6 = 576$  ← **96**  
 $40 \times 1 = 40$   
 $70 \times 4 = 280$     most frequent  
 $60 \times 1 = 60$   
 $40 \times 4 = 160$   
 $\frac{20}{20} \frac{1566}{1566}$

a) mean =  $\frac{1566}{20} = 78.3$   
 b) median: Between 10<sup>th</sup> & 11<sup>th</sup>  
 $\frac{96+90}{2} = 93$

In 7-8, given a sample from a population.  
 divide by  $n-1$ .

7.  $7-11 = -4$     16  
 $12-11 = 1$     1  
 $16-11 = 5$     25  
 $9-11 = -2$     4

$\frac{4 \overline{)44}}{11 \text{ mean}}$        $\frac{3 \overline{)46}}{15.3}$

$\sigma = \sqrt{15.3} = 3.92$

8.  $150-110 = 40$      $40^2 = 1600$     9a) 84%  
 $12-110 = -98$      $(-98)^2 = 9604$     c) 95%  
 $356-110 = 246$      $(246)^2 = 60516$     c) 16%  
 $48-110 = -62$      $(-62)^2 = 3844$     d) 2.5%  
 $58-110 = -52$      $(-52)^2 = 2704$     e) 97.5%  
 $6-110 = -104$      $(-104)^2 = 10816$     f) 83.5%

$\frac{6 \overline{)660}}{110}$        $\frac{5 \overline{)36864}}{17372.8}$

$\sigma = \sqrt{17372.8} = 131.81$

- 10a)  $2\frac{1}{2} - 3\frac{1}{2}$     11. A    17.  $Z_B = \frac{16-12}{2.5} = 1.6$   
 b) 2-4    12. C  
 c) 2.5%    13. C     $Z_T = \frac{4-3}{.5} = 2$   
 d) 2.5%    14. C  
 e) 47.5%    15. D  
                  16. C
- Francis farther to right of mean.

18a)  $Z_{55000} = \frac{55000 - 50,000}{10,000} = .5$   
 $A = .192$     **19.2%** Between

a)  $\frac{.500 - .192}{.308} = 30.8\%$

c)  $Z_{32000} = \frac{32000 - 50,000}{10,000} = -1.8$   
 $A = .464$

