Elementary Statistics
Test 1 Preparation

This is not a sample test. If you know how to do all the problems in this, you will be ready for the test. The actual test is written for 50 minutes.

1   Use the following stem display of 1995 P/E forecast of 28 American companies to
     answer the questions.
              16 | 8
              15 | 4
              14 | 0 6 7 8 9
              13 | 5 6 8 8
              12 | 0 8
              11 | 3 3 5 7
              10 | 4
               9 | 1 4 5 8 8
               8 | 0 0 1
               7 |
               6 |
               5 | 2
               4 | 7
              n = 28
              Stem unit = 1.0
              Leaf unit = 0.1

     (a)   List the smallest and the largest.
     (b)   Find the mean of the data.
     (c)   Find the mode/s of the data.
     (d)   Find the median of the data.
     (e)   Which measure (mean, median or both) better represents the center of data?
            Explain why?

2   If somebody invests $2,000 at 5%, $3,000 at 6.3%, and $20,000 at 7%, what is the
     overall percentage yield of these investments?

3   During a special promotion, a discount chain sold 200, 235, and 300 TV sets in three of
     its stores at average prices $250, $235 and $220, respectively. What is the mean price of
     the TV sets sold?

4   Assume the following data in thousands of dollars is the annual salaries of 40 employees
     of a small company in 1990. Construct a frequency table using the following data and
     the classes given in the table.

23	24	18	14	20	25	26	29	31	37
33	16	23	11	16	22	26	31	35	22
49	50	35	55	35	46	43	60	41	48
36	19	55	37	33	23	28	44	36	41

Class	Tally	Frequency	Relative Freq.
10-19			
20-29			
30-39			
40-49			
50-59			
60-69			

5   Find the class limits, class marks, class boundaries, and class interval using the data from problem 4.

6   Draw a histogram and a frequency polygon on the same graph using the data from problem 4.

7   Construct a relative (percentage) frequency distribution using the data from problem 4.

8   Assume that a sample of 25 workers in Pittsburgh provided the following information about their hourly wages
11.50, 8.40, 11.75, 10.05, 10.25, 8.00, 13.65, 7.05, 9.05, 11.90, 9.90, 6.85, 15.35, 11.10, 14.70, 13.15, 13.10, 6.65, 13.10, 9.20, 9.15, 12.05, 8.45, 5.85, 9.80

Find the five number summery and draw a box plot. Are there any outliers?

9   Find (a) the range, (b) the standard deviation and (c) the variance of the following average hourly wages in 5 local grocery stores.

$$6.25, 6.75, 6.00, 8.50, 7.50$$

10   Explain the empirical rule.

11   A stock A has an average value of $63.45 with a standard deviation of $8.18 during the last four weeks. Another stock, stock B has an average value of $24.23 with a standard deviation of $4.09 during the same period. Which stock has a more consistent price?

12   Former NBA superstar Michael Jordan is 78 in. tall, and WNBA basketball player Rebecca Lobo is 76 in. tall. Jordan is obviously taller by 2 in., but which player is relatively taller? Men have heights with a mean of 69.0 in. and a standard deviation of 2.8 in.; women have heights with a mean of 63.6 in. and a standard deviation of 2.5 in (based on data from the National Health Survey).

13   A travel brochure lists 12 museums in the city of London. In how many ways can a tourist visit four museums
(a)   if the order in which the museums are visited does not mater;
(b)   if the order in which the museums are visited does matter?

14   What is the probability of rolling a total of 7 with two fair 4-sided dice?

15   Give an example for each of the following types of data. (Nominal, ordinal, interval, and ratio)

16   Define a population and a sample.

17   An importer is offered a shipment of pineapples for $10000, and the probabilities that he will be able to sell them for $15000, $12000, or $8000 are 0.34, 0.36, and 0.30. What is the importer's expected profit?

18   Explain the following:
      (a)   Measures of location.
      (b)   Measures of variation.
      (c)   Measure of relative variance.

19   Classify the following measures in to the given groups.
      (1) Mean, (2) Range, (3) Variance, (4) Coefficient of Variation, (5) Median, (6) Any measure which explains the center of data, and (7) Any measure which explains the spread of the data.

Measure of Location	Measure of Variation	Measure of Relative Variance

20   In how many different ways can one select 4 cards out of an ordinary pack of 52 without order?

21   In how many different ways can one select 4 people out of 100 with order?

22   If you roll two six-sided balanced dice, what is the probability that the sum of the two numbers is 7? Note there are 36 equally likely possibilities.

23   Classify the following variables to one of the four data types.

      Weight, blood type, temperature, calendar year

24   Match the following symbols with the definitions.
      μ s $\bar{\bar{X}}$ s^2 $\tilde{X}$ σ Q_1 $\bar{X}$

      (a)   Sample mean   (g)   Weighted mean
      (b)   Sample variance   (h)   Summation notation
      (c)   Population mean   (i)   Sample standard deviation
      (d)   Population variance   (j)   Population standard deviation
      (e)   Median   (k)   First quartile
      (f)   Grand mean   (l)   Other

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	Column1
Mean	
Standard Error	0.581961
Median	11.6
Mode	13.8
Standard Deviation	3.079448
Sample Variance	9.483003
Kurtosis	-0.34911
Skewness	-0.46434
Range	12.1
Minimum	
Maximum	16.8
Sum	322.5
Count	28

Find the following using the above EXCEL output.

    (a) $\bar{X}$

    (b) s

    (c) $\sum x_i$

    (d) n

    (e) $\tilde{X}$

    (f) Minimum

26   Draw a dot plot for the following data.

0	0	0	1	2	1	0	1	2	0	1
1	0	2	0	0	1	1	2	3	1	2

27   Draw a Pareto plot for the color of the car using the following data.

Customer Number	Color of the Car
1	White
2	Blue
3	Red
4	White
5	White
6	Black
7	Blue
8	Black
9	Green
10	Black

28   (a)   What are the five number summary in the following MINITAB output?

         _____   _____   _____   _____   _____

      (b)   What is the sample mean?
      (c)   What is the sample standard deviation?
      (d)   Calculate is the range?
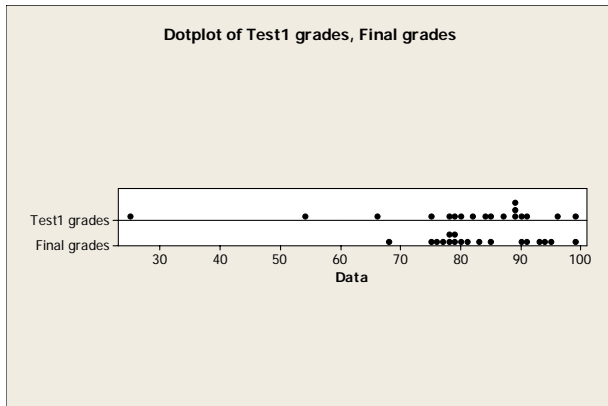   (e)   Calculate the sample variance.

Descriptive Statistics

Variable	N	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3	Maximum
C1	14	71.79	5.89	22.03	12.00	67.25	78.50	84.50	95.00

29   Make a few comments about the following box plot.
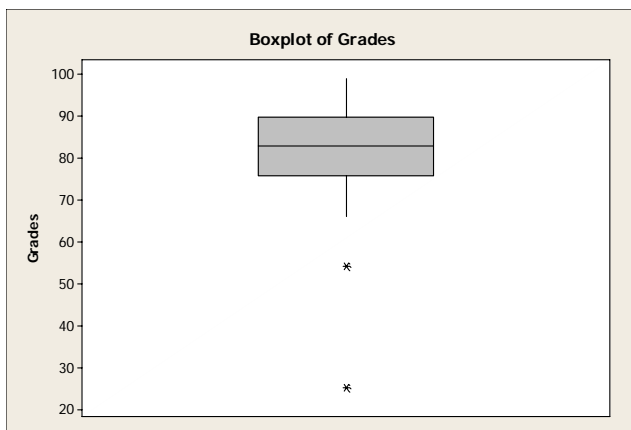
30   Which variable has higher variability? Test 1 grade or Final grade?

31   Compare the variance of the two variables using range and standard deviation using the
      following MINITAB output.

Variable	N	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Test1 grades	18	79.89	4.08	17.32	25.00	77.25	84.50	89.25	99.00
Final grades	18	83.39	1.98	8.42	68.00	77.75	80.50	91.50	99.00