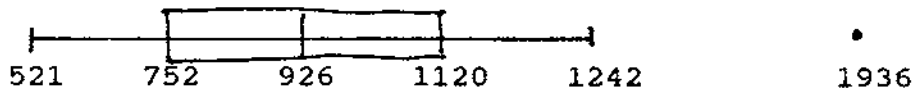


Probability and Statistics Test
National Mu Alpha Theta Summer, 1994

Given: Heights of basketball players on the Glenn View High School varsity(measured in inches) were:
74,68,75,72,71,76,70,74,69,67,75,74,71,72

1. Find $\sum x$
a) 14 b)72 c) 979 d)1008 e)1199
2. Find \bar{x}
a) 14 b)72 c)72.5 d)70 e)71.6
3. Find upper quartile value
a)72 b)74 c)74.5 d)75 e)75.5
4. Find standard deviation
a)2.699 b)2.724 c)2.769 d)2.801 e)2.814
5. Find variance
a)1.432 b)2.699 c)7.286 d)12.56 e)72.9
6. Choose which statement best describes the data set.
a)all measures(mean,median,and mode) are represented by the same value
b)the distribution is more heterogeneous
c)there is at least one outlier value
d)the mean deviation is within 3/10 of the S.D.
e)the range of the data is greater than 10

7. Given the following box plot:



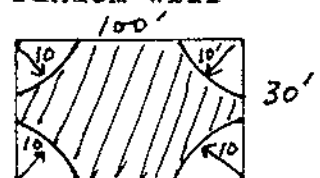
The value 926 represents the:

- a)mean b)median c)mode d)average e)outlier
8. A raise of \$2.85/hr is to be given to an employer. In the last place you worked, the following rates were paid:

Manager	\$18,500/yr
Cleaner	\$3.75/hr
Cook	\$4.10/hr
Cashier	\$3.90/hr

 If there is 1 manager, 15 cleaners, 12 cooks, and 14 cashiers, which measure of central tendency would give the highest average salary?
 a) mean b)median c)mode d)variance

9. What is the probability that a point selected at random will be in the shaded area?
a) .015 b) .895 c).333 d).700 e).925



10. The probability of correctly guessing a particular two-digit number is
 a)0.0100 b)0.1000 c)0.0111 d)0.0123 e)0.5000
11. Suppose it is known that 40% of the female and 30% of the male students support a change in the school's constitution. An editorial is written anonymously for the school newspaper. What is the probability that the phantom editor is male?
 a)0.120 b)0.212 c)0.346 d)0.378 e)0.399
12. In a binomial experiment, if $p=0.30$, then $q=?$
 a)0.30 b)0.50 c)0.60 d)0.65 e)0.70
13. A distribution of raw scores represents the number of items that are answered correctly by 30 students in an AP History class. The mean of the distribution of correct answers was 50, and the standard deviation was 6. Charlie's z-score for a raw score of 53 is
 a).500 b).563 c).600 d)2 e)3
14. For lotteries, we often select numbers at random from the ten digits{0,1,2,3,4,5,6,7,8,9}. Select 50 digits randomly, one at a time without replacement. What is expected value of each of the outcomes?
 a) 1/5 b) 1/10 c) 2 d) 5 e) 9
15. Given the data for frequency and wavelength, choose the best model.... (3000,0.2) (200,0.4) (10000,0.01) (350,2.4) (3750,0.15) (300,1.2)
 a) $y = 326.996 x^{-1}$ b) $y = 1.08(.9995)^x$
 c) $y = 3 \times 10^{-8}x^2 - 4.7 \times 10^{-4}x + 1.4$ d) $y = -1.4x + 1.146$
16. You attempt to load a 6-sided die to increase the probability for rolling a 1. To check your success you roll the die 600 times and a ONE turns up 114 times. A point estimate for p is
 a) 0.19 b) 0.167 c) 0.234 d) 0.81 e) 0.926
17. In a normal distribution the mean is 50 and the standard deviation is 10. Find the percent represented by the area to the left of the mean
 a) 10% b) 20% c) 30% d) 40% e) 50%
18. A histogram showing the number of hours of summer sunshine per day in St. John's Newfoundland would have much of its data clustered around the mean. What would a histogram showing the number of hours of cloudiness look like?
 a) a right side bell curve b) an upside down bell curve
 c) a rectangle d) a square
19. A bag contains 3 red marbles and 7 green marbles. Find the odds of selecting a green marble
 a) 7:3 b) 3:7 c) 7:10 d) 10:7 e) 3:10

20. Suppose you are tossing a fair die and a fair coin. Find the probability $P(T,3)$
 a) $1/4$ b) $1/6$ c) $1/8$ d) $1/12$
21. Two integers (between 1 and 30 inclusive) are chosen by a random number generator on a computer. What is the probability that the same number is chosen twice?
 a) $1/900$ b) $2/15$ c) $1/30$ d) $1/60$
22. Clinton, Gore and Carter are candidates for public office. It is estimated that Gore and Carter have about the same probability of winning, and Clinton is believed to be twice as likely to win as either of the others. Find the probability of Carter winning the election.
 a) $1/2$ b) $1/4$ c) $1/6$ d) $1/8$

Four letters and envelopes are addressed to four different people. If the letters are randomly inserted into the envelopes, what is the probability that.....

23. exactly one will be inserted in the correct envelope?
 a) $1/2$ b) $1/3$ c) $1/4$ d) $1/16$
24. at least one will be inserted in the correct envelope?
 a) $1/7$ b) $1/4$ c) $5/8$ d) $3/16$
25. In a sample of 100 batteries, 3 are defective. What is the probability of buying a good battery?
 a) 0.3 b) 0.03 c) 0.97 d) 0.09

Tie Breaker #1

Write an equation (math model) for the data from a pendulum experiment that would best fit.....

length	10	20	30	40	50	60	70	80
time	.6	.9	1.1	1.4	1.4	1.5	1.7	1.8

Tie Breaker #2

The number of batteries found defective in a sampling by inspector A are given as 83,156,72,92,78,9,101 and 69. Calculate the mean deviation and estimate the number of defective batteries inspector A would expect in the next sample.