**2013 KCATM – 12th Grade Probability and Statistics** Name _____

For questions 1-5, consider the following frequency table, representing the number of runs scored by a baseball team during a 162 game season.

| Runs | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | 8 | 11 | 28 | 43 | 32 | 16 | 10 | 8 | 1 | 2 | 3 |

1) What is the mode number of runs scored?

   a. 1
   b. 2
   c. 3
   d. 4
   e. 5

2) What is the median number of runs scored?

   a. 1
   b. 2
   c. 3
   d. 4
   e. 5

3) What is the mean number of runs scored?

   a. 3.45
   b. 3.50
   c. 3.56
   d. 3.61
   e. 3.67

4) What is the standard deviation of the number of runs scored?

   a. 2.01
   b. 2.03
   c. 2.05
   d. 2.07
   e. 2.09

5) Find the interquartile range.

   a. 1
   b. 2
   c. 3
   d. 4
   e. 5

For questions 6-10, consult the following chart below, regarding all students that had either blue or brown eyes in a particular graduating class.

| | Blue Eyes | Brown Eyes | Total |
|---|---|---|---|
| Male | 12 | 42 | 54 |
| Female | 15 | 31 | 46 |
| | 27 | 73 | 100 |

6) Find the probability that a person randomly selected from this group had brown eyes.

a. 27%
b. 31%
c. 42%
d. 46%
e. 73%

7) Find the probability that a person randomly selected from the female group had blue eyes.

a. 15%
b. 22%
c. 33%
d. 44%
e. 55%

8) Find the probability that a person randomly selected from the brown eye group was a male.

a. 58%
b. 63%
c. 68%
d. 73%
e. 78%

9) Find the probability that a person selected at random from this group either had blue eyes or was female.

a. 58%
b. 69%
c. 75%
d. 85%
e. 88%

10) Find the probability that a person selected at random from this group had both brown eyes and was female.

a. 12%
b. 15%
c. 27%
d. 31%
e. 42%

For questions 11-15, suppose a sample of 225 oranges are collected. The weight of the oranges is normally distributed with a mean of 7.4 ounces and a standard deviation of 0.8 ounces.

11) Find the probability that an orange randomly selected from the sample weighed at least 7.7 ounces.

a. 30%
b. 32%
c. 34%
d. 36%
e. 38%

12) Find the probability that an orange randomly selected from the sample weighed between 6.7 and 7.8 ounces.

a. 50%
b. 52%
c. 54%
d. 56%
e. 58%

13) Find the probability that an orange randomly selected from the sample weighted at most 8.4 ounces.

a. 83%
b. 85%
c. 87%
d. 89%
e. 91%

14) Find the z-score for an orange that weighed 6.84 ounces.

a. -0.9
b. -0.8
c. -0.7
d. -0.6
e. -0.5

15) An orange in the $95^{th}$ percentile would have what weight?

a. 8.60 ounces
b. 8.63 ounces
c. 8.66 ounces
d. 8.69 ounces
e. 8.72 ounces

For questions 16-20, suppose a biased coin comes up heads with probability 0.3 when tossed.

16) An experiment is preformed until the coin yields a head. Which distribution best describes this experiment?

a. Binomial
b. Geometric
c. Logarithmic
d. Normal
e. Poisson

17) The coin is flipped 25 times and the number of heads and tails are recorded. Which distribution best describes this experiment?

a. Binomial
b. Geometric
c. Logarithmic
d. Normal
e. Poisson

18) If the coin is flipped 6 times, what is the probability that exactly 3 heads were recorded?

a. 13%
b. 15%
c. 17%
d. 19%
e. 21%

19) If the coin is flipped 6 times, what is the probability that at least 4 heads were recorded?

a. 7%
b. 9%
c. 11%
d. 13%
e. 15%

20) If the coin is flipped 6 times, what is the probability that at most 4 heads were recorded?

a. 91%
b. 93%
c. 95%
d. 97%
e. 99%

21) How many different ways are there to arrange the letters in the word KANSAS?

a. 120
b. 180
c. 360
d. 540
e. 720

22) How many different ways can we arrange 6 different desserts on a circular tray?

a. 120
b. 180
c. 360
d. 540
e. 720

23) One card is pulled from a standard deck of 52 cards. Find the probability that the card is either a Jack or a heart.

a. 25%
b. 27%
c. 29%
d. 31%
e. 33%

24) How many different ways can a five person committee be selected from a group of 7 people?

a. 14
b. 21
c. 28
d. 35
e. 42

25) Suppose 35% of the residents of New York City read the USA Today, 40% read the New York Times, and 5% read both the USA Today and the New York Times. How many people read neither newspaper?

a. 20%
b. 25%
c. 30%
d. 35%
e. 40%

26) Suppose $f(x) = kx$ represents a probability density function from x = 0 to x = 2. What is the value of k?

a. 1/4
b. 1/2
c. 1
d. 2
e. 4

27) Suppose you are playing a game where if you draw an Ace from a standard deck of 52 cards, you win $20. If you don't draw an ace, you lose $3. What is your expected value?

a. -$17.00
b. -$2.46
c. -$1.23
d. $0.00
e. $1.07

28) Suppose every number in a set of data is tripled. What effect does this have on the standard deviation?

a. Multiplies it by a factor of 1/9
b. Multiples it by a factor of 1/3
c. Stays the same
d. Multiplies it by a factor of 3
e. Multiplies it by a factor of 9

29) Suppose variables A and B are independent. If the standard deviation of variable A is 3 and the standard deviation of variable B is 4, what is the standard deviation of the variable A + B?

a. 3.5
b. 4
c. 5
d. 7
e. 12

30) A linear regression is performed on a set of data and the resulting calculation indicates an r-value of -1. Which of the following sets of data has an r-value of -1?

a. {(-1, 2), (2, -1), (5, -1), (-1, 4)}
b. {(8, 6), (9, 7), (10, 8), (14, 12)}
c. {(1, -1), (8, -6), (15, -11), (22, -16)}
d. {(0, 10), (1, 8), (2, 5), (3, 1)}
e. None of the above data has an r-value of -1.

31) The $50^{th}$ percentile is the same as the _____.

a. Median
b. Mean
c. Mode
d. Standard Deviation
e. Variance

32) Find the interquartile range for a set of data with minimum = 1, 1st quartile = 4, median = 6, 3rd quartile = 9, maximum = 11.

a. 2
b. 3
c. 4
d. 5
e. 6

33) You are constructing a sampling distribution where n = 100. If you would like the standard deviation to be cut in half, what value should you use for n?

a. 25
b. 50
c. 100
d. 200
e. 400

34) A binomial setting consists of 100 independent trials with a success rate of 0.5. The count of X successes is a binomial random variable. Find the mean and the standard deviation of this random variable.

a. Mean = 100, S.D. = 50
b. Mean = 100, S.D. = 25
c. Mean = 50, S.D. = 25
d. Mean = 50, S.D. = 10
e. Mean = 50, S.D. = 5

Questions 35-39 are matching.

35) _____ Chi-Squared Distribution

36) _____ F-test

37) _____ Poisson Distribution

38) _____ Residual

39) _____ Variance

A) Used to calculate the probability that an event occurs given in a fixed interval.

B) Uses a Variance Ratio in its computation

C) Standard Deviation Squared

D) Associated with goodness of fit tests

E) The difference between an data value a predicted data value as determined by a regression equation.