NIQ

Statistics Test

For questions 1-4 use the following table, which shows the length in minutes of 64 international phone calls using a prepaid calling card
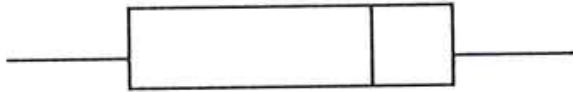
Length of call (in minutes)	Frequency	Relative frequency	Cum. relative frequency
4	25	0.3906	
14	15		
24	10	0.1563	
34	9	0.1406	
44	4	0.0625	
54	1	0.0156	1.000

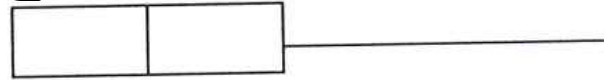1. The histogram of this data looks to be

   a. Skewed right   b. Skewed left   c. Symmetrical

2. Which of the following box plots most accurately displays the data?
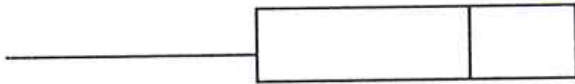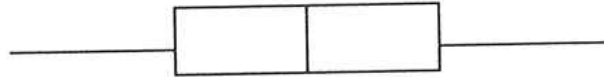
a.

b.

c.

d.

3. What percent of telephone calls were more than 24 minutes?

    a. 15.63%   b. 21.88%   c. 62.5%   d. 78.13%

4. Find the 80th percentile

    a. 14   b. 24   c. 34   d. 70

5. What can be said about a set of data when its standard deviation is small (but not zero)?
   a. The data are far apart
   b. All of the data have the same value
   c. The mean of the data can never be zero
   d. The data are close together

For questions 6 and 7, refer to the following

A sample of students was taken to determine pulse rate. The data is shown:

Pulse rate (beats per minute)	54	58	65	68	72	76	80	90	98
Frequency (no. of students)	1	3	6	8	5	3	8	4	2

6. Find the median and mode(s)

    a. 72; 68 and 80   b. 72; 80   c. 76; 68   d. 76; 68 and 80

7. Out of the entire college population of 24,000 students, approximately what percent of students are expected to have a pulse rate of 65?

   a. 6   b. 40   c. 9   d. 15

8. I toss a fair coin a large number of times. Assuming the tosses are independent, which of the following is true?
   a. Once the number of flips are large enough, the number of heads will always be exactly half of the total number of tosses. For example, after 10,000 tosses I should have exactly 5,000 heads.

   b. The proportion of heads will be about 1/2 and this proportion will tend to get closer to 1/2 as the number of tosses increases.

   c. As the number of tosses increases, any long run of heads will be balanced by a corresponding run of tails so that the overall proportion of heads is exactly 1/2.

   d. All of the above.

For questions 9-11, refer to the following

A sample of twenty people went on a cruise to Alaska. Their two-week weight gain is shown below (a weight loss is shown by a negative number).

Weight Gain	Frequency
-2	4
0	5
2	8
5	2
9	1

9. The middle 50% of the data is between _____ and _____.

   a. 0 and 2   b. 0 and 9   c. 2 and 9   d. -2 and 2

10. Find the average weight gain

   (a.) 1.35   b. 2.74   c. 2   d. There is not enough
                                                        information

11. What weight gain is 3 standard deviations above the mean?

   a. 4.05   b. 8.19   (c.) 9.57   d. There is not enough
                                                          information

For questions 12-14, use the following information

Kim, a personal trainer, was interested in whether or not there was a linear relationship between the number of visits her clients made to the gym each week and the average amount of time her clients exercised per visit. She took the following data.

Client	1	2	3	4	5	6
Number of visits per week	1	3	4	2	3	5
Average time spent exercising per visit (in hours)	2	1.5	1	2	1	0.3

12. The line that best fits the data is

   a. $\hat{y} = -0.44 + 2.62x$ b. $\hat{y} = 0.44 + 2.62x$

   c. $\hat{y} = 2.62 + 0.44x$ (d.) $\hat{y} = 2.62 - 0.44x$

13. Using the best fit line, estimate the average time spent exercising per visit for 4 visits per week

   a. 2 hours   (b.) 0.86 hours   c. 1 hour   d. 10.04 hours

14. Kim used the best fit line to estimate the average time spent exercising per visit for her client Toby who visited the gym 7 times per week. Does the least squares line give an accurate estimate?

   a. Yes   (b.) No   c. Maybe   d. Not enough information is
                                                          given

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15. If the correlation coefficient is -1, which answer is correct?

    a. The slope of the best fit line is positive.
    b. The slope of the best fit line is -1.
    c. The data fit exactly on a line with positive slope.
    d. The data fit exactly on a line with negative slope.

16. A scatter plot shows

    a. The direction and strength of a relationship between the independent and dependent variables.
    b. That there is a linear relationship between the independent and dependent variables.
    c. How you can predict the dependent variable knowing the independent variable.
    d. Nothing. The line of best fit is what is important.

For questions 17-18, use the following information

According to the 2000 United States Census, 12.3% of the population is Black or African American.

17. The probability that a randomly selected U.S. resident is not Black or African American is

    a. 0.123   b. 0.877   c. 0.754   d. Cannot determine

18. The probability that 2 randomly selected U.S. residents are not Black or African American is

    a. 0.123   b. 0.877   c. 0.769   d. Cannot determine

19. In an exponential distribution, the mean is larger than the median

    a. True   b. False

20. In Fall 1999, students in one Math 10 section determined that the length of movies at the cinema was normally distributed with a mean of 148 minutes, and a standard deviation of 19 minutes.
Find the third quartile and interpret it.

   a. 75 minutes; Three-fourths of the movie lengths fall below 75 minutes.
   b. 160.8 minutes; Three-fourths of the movie lengths fall below 160.8 minutes.
   c. 160.8 minutes; Three-fourths of the movies last 160.8 minutes.
   d. 75 minutes; Three-fourths of the movies last 75 minutes.

21. In a binomial distribution we

   a. Count the number of successes until a failure is obtained
   b. Count the number of trials until a success is obtained
   c. Count the number of successes in a finite number of trials
   d. Count the number of trials until the number of successes equals the number of failures

22. Certain stocks have a probability of 0.6 of returning a $100 profit. They also have a probability of 0.4 of having a loss of $300. Over the long run, what is the best thing to do to maximize your profit, and why?

   a. Invest in the stocks because there is a greater probability of making money than losing money.
   b. Do not invest in the stocks because the dollar amount for each loss is greater than the dollar amount for each gain.
   c. Invest in the stocks because making $100 per stock is preferred to losing $300 per stock.
   d. Do not invest in the stocks because the expected value is a loss.

For questions 23-27, refer to the following table

Data from the Institutional Research Department of the Foothill-De Anza Community College District for De Anza College

	American Indian	Asian/ Pacific Islander	Black	Hispanic	White	Undeclared	**TOTAL**
Administrator	0	3	5	5	21	0	**34**
Staff	1	35	21	30	201	16	**304**
Faculty	3	58	14	45	141	17	**278**
TOTAL	**4**	**96**	**40**	**80**	**363**	**33**	**616**

Suppose that one De Anza College employee is randomly selected.

23. Find P(the employee is an Administrator)

    a. 278/34   b. 304/616   c. 34/616   d. 80/616

24. Find P(the employee is Faculty AND American Indian)

    a. 382/616   b. 3/616   c. 3/4   d. 3/278

25. Find P(the employee is Staff OR Hispanic)

    a. 384/616   b. 80/616   c. 304/616   d. 354/616

26. Find P(the employee is an Administrator GIVEN the employee is Black)

    a. 40/616   b. 5/34   c. 5/616   d. 5/40

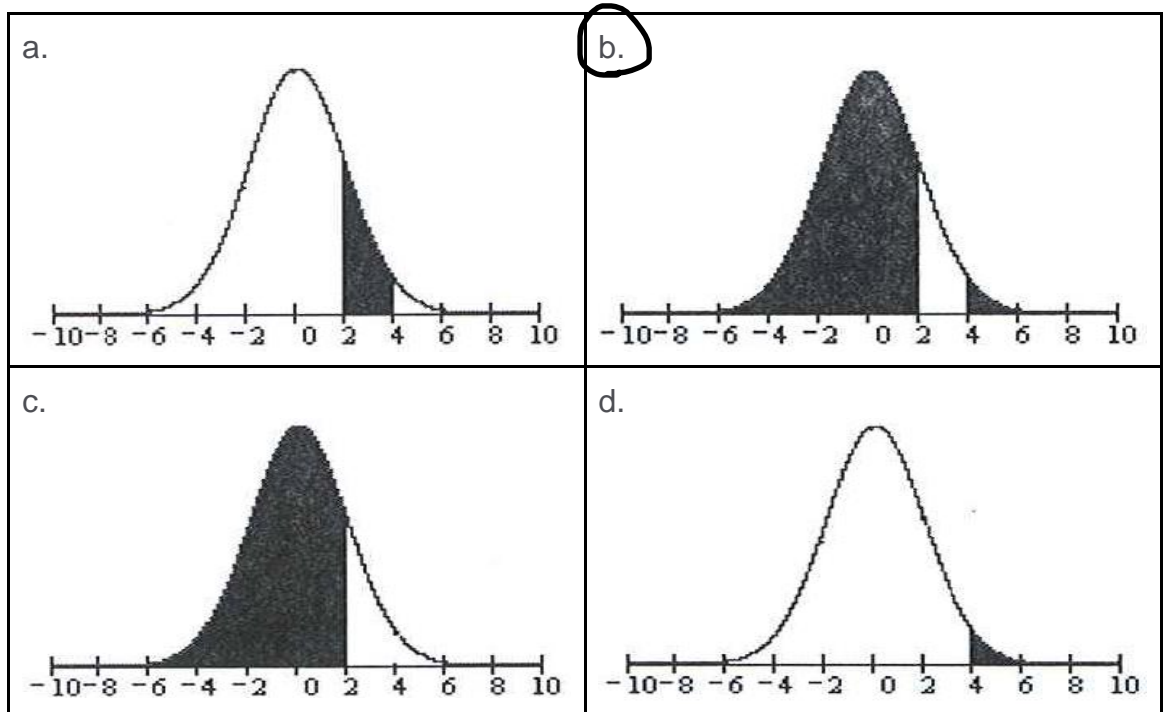27. Being an Administrator and an American Indian are

    a. Mutually exclusive events
    b. Independent events
    c. Mutually exclusive and independent events
    d. Neither mutually exclusive nor independent events

28. P(X>4 or X<2) is best described by which of the following graphs?

a.

b.

c.

d.

29. We use the z-score to

a. Compare normal distributions with different averages and standard deviations
b. Drive statistics students nuts
c. Compare exponential distributions with the same average
d. Compare uniform distributions with different minimum and maximum numbers

30. A study of a certain brand of AA batteries yielded a sample mean lifetime of 450 minutes with a sample standard deviation of 92 minutes. A hypothesis test was performed using the following following hypotheses:

Ho: $\mu = 480$ Ha: $\mu < 480$

The type I error for this hypothesis test is

a. To conclude that the average battery lifetime is less than 480 minutes when, in reality, it is equal to 480 minutes
b. To conclude that the average battery lifetime is NOT equal to 480 minutes when, in reality, it actually is equal to 480 minutes
c. To conclude that the average battery lifetime is equal to 480 minutes when, in reality, it is less than 480 minutes
d. To conclude that the average battery lifetime is greater than 480 minutes when, in reality, it is equal to 480 minutes

For questions 31-33, refer to the following

In a study of vehicle safety, 15 minivans were crash tested and the repair costs for each of the 15 minivans were recorded. For these 15 minivans, the average repair cost was $1786 and the standard deviation was $937 (based on data from the Highway Loss Data Institute). Suppose that you want to test the hypothesis that the average repair cost is under $2000. Assume that the underlying population of repair costs follows a normal distribution. Assume that the null hypothesis is $\mu \geq 2000$.

31. What is the meaning of type of error beta

    a. Error of estimation of the average   b. Risk of rejecting correct Ho

    c. Risk of accepting wrong Ho   d. Risk of rejecting wrong Ha

32. At a 5% level of significance (α), the correct decision for this hypothesis test is

    a. Reject Ho because α is more than the p-value
    b. Reject Ho because α is less than the p-value
    c. Do not reject Ho because α is more than the p-value
    d. Do not reject Ho because α is less than the p-value

33. The appropriate distribution for this test is

    a. Normal with standard deviation $937
    b. t with degrees of freedom = 15
    c. t with degrees of freedom = 14
    d. Normal with standard deviation $241.93

34. There are 185 statistics students in a Midwestern college, and their mean age is 26.3 with a standard deviation of 8.0. If each student is required to find the ages of a sample of 16 students, what is the standard deviation of the sampling distribution of the sample means?

    a. 1.86   b. 1.92   c. 2.83   d. 4

35. What is the interquartile range of this set of numbers { 9, 8, 9, 11, 15, 14, 8, 11, 12, 12 }

    a. 1.5   b. 2   c. 2.5   d. 3