1. A random sample of 25 birthweights (in ounces) is taken, yielding the following summary statistics:

Variable	N	Mean	Median	TrMean	StDev	SE Mean
Birthwt	25	129.40	129.00	128.35	17.41	3.48

Variable	Minimum	Maximum	Q1	Q3
Birthwt	96.00	187.00	119.50	135.50

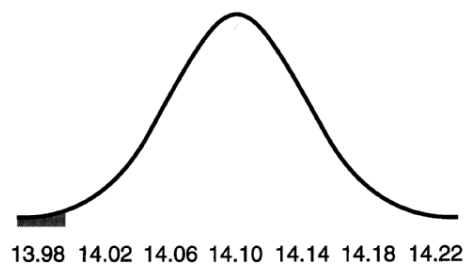What can be said about the number of outliers for this data set?

(A) 0

(B) At least 1

(C) No more than 1

(D) At least 2

(E) No more than 2

2. Given two events, A and B, if $P(A) = 0.43$, $P(B) = 0.26$, and $P(A \cup B) = 0.68$, then the two events are

(A) mutually exclusive but not independent.

(B) independent but not mutually exclusive.

(C) mutually exclusive and independent.

(D) neither mutually exclusive nor independent.

(E) Not enough information is given to determine whether A and B are mutually exclusive or independent.

3. In a certain county, a newspaper reports that the average family income in the county is $45,000. First-time home buyers believe that the average income is less than reported. Which of the following hypotheses would be appropriate for a significance test?

(A) $H_0: \mu = 45,000$; $H_a: \mu \neq 45,000$

(B) $H_0: \mu = 45,000$; $H_a: \mu > 45,000$

(C) $H_0: \mu = 45,000$; $H_a: \mu < 45,000$

(D) $H_0: \mu \neq 45,000$; $H_a: \mu = 45,000$

(E) $H_0: \mu > 45,000$; $H_a: \mu = 45,000$

4. Weights for a box of cereal are normally distributed with a mean of 14.10 oz and a standard deviation of 0.04 oz. Which of the following illustrates the probability of selecting a box with at *least* the advertised weight of 14 oz?

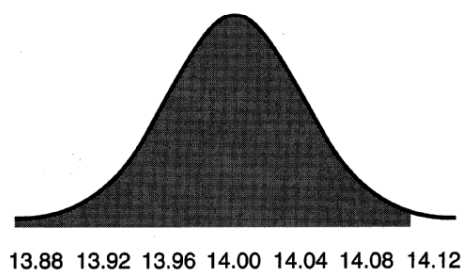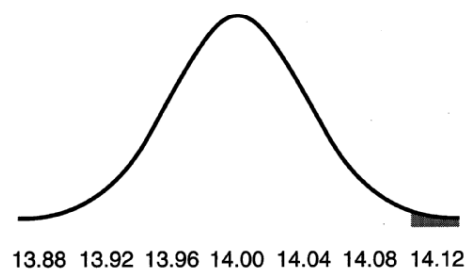(A)

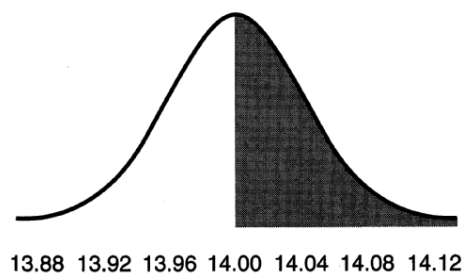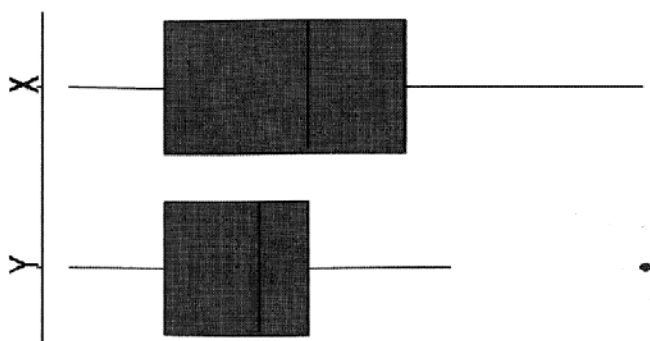13.98 14.02 14.06 14.10 14.14 14.18 14.22

(B)

13.98 14.02 14.06 14.10 14.14 14.18 14.22

(C)

13.88 13.92 13.96 14.00 14.04 14.08 14.12

(D)

13.88 13.92 13.96 14.00 14.04 14.08 14.12

(E)

13.88 13.92 13.96 14.00 14.04 14.08 14.12
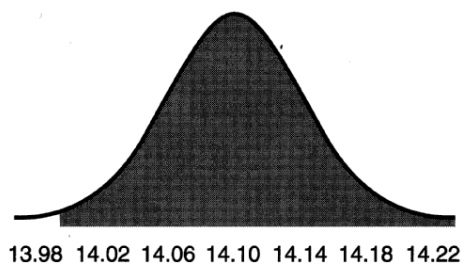
5. The boxplots below summarize two data sets, X and Y. Which of the following MUST be true?

(A) Set X and set Y have the same number of data points.

(B) The box of set X contains more data points than the box of set Y.

(C) The data in set X have a larger range than the data in set Y.

(D) About 50% of the values in set X are greater than about 75% of the values in set Y.

(E) The median of set X is less than the median of set Y.

6. A newlywed couple is trying to choose one of two neighborhood supermarkets for their grocery shopping. They decide to randomly select 20 items, check their prices at each store, then conduct a test to determine if one store is significantly less expensive than the other. What test should they conduct?

(A) Two-sample z-test

(B) Two-sample t-test

(C) Matched-pairs t-test

(D) χ^2 goodness-of-fit test

(E) Linear regression t-test

7. In a certain community, 20% of cable subscribers also subscribe to the company's broadband service for their Internet connection. You would like to design a simulation to estimate the probability that one of six randomly selected subscribers has the broadband service. Using digits 0 through 9, which of the following assignments would be appropriate to model this situation?

    (A) Assign even digits to broadband subscribers and odd digits to cable-only subscribers.

    (B) Assign 0 and 1 to broadband subscribers and 2, 3, 4, 5, 6, 7, 8, and 9 to cable-only subscribers.

    (C) Assign 0, 1, and 2 to broadband subscribers and 3, 4, 5, 6, 7, 8, and 9 to a cable-only subscribers.

    (D) Assign 1, 2, 3, 4, 5, and 6 to broadband subscribers and 7, 8, 9, and 0 to cable-only subscribers.

    (E) Assign 0, 1, and 2 to broadband subscribers; 3, 4, 5, and 6 to cable-only subscribers; and ignore digits 7, 8, and 9.

8. The number of T-shirts a school store sells monthly has the following probability distribution:

# of T-shirts, X	0	1	2	3	4	5	6	7	8	9	10
$P(x)$	0.02	0.15	0.18	0.21	0.14	0.08	0.08	0.04	0.03	0.02	0.05

If each T-shirt sells for $10 but costs the store $4 to purchase, what is the expected monthly T-shirt *profit?*

    (A) $ 3.78

    (B) $15.12

    (C) $22.68

    (D) $30.00

    (E) $37.80

9. A population has a distribution that is strongly skewed right. For the sampling distribution of means for samples of size 5, which of the following are true about the shape, center, and spread of the sampling distribution?

	Shape	Mean	Standard Deviation
(A)	Skewed right	Equal to that of the population	Less than that of the population
(B)	Skewed right	Equal to that of the population	Equal to that of the population
(C)	Skewed right	Equal to that of the population	Greater than that of the population
(D)	Approximately normal	Equal to that of the population	Less than that of the population
(E)	Approximately normal	Equal to that of the population	Equal to that of the population

10. A young woman works two jobs and receives tips for both jobs. As a hairdresser, her distribution of weekly tips has mean $65 and standard deviation $5.75. As a waitress, her distribution of weekly tips has mean $154 and standard deviation $8.02. What are the mean and standard deviation of her combined weekly tips? (Assume independence for the two jobs.)

(A) mean $167.16; standard deviation $9.87

(B) mean $167.16; standard deviation $13.77

(C) mean $219.00; standard deviation $2.27

(D) mean $219.00; standard deviation $9.87

(E) mean $219.00; standard deviation $13.77

11. A cause-and-effect relationship between two variables can best be determined from which of the following?

(A) A survey conducted using a simple random sample of individuals

(B) A survey conducted using a stratified random sample of individuals

(C) When the two variables have a correlation coefficient near 1 or -1

(D) An observational study where the observational units are chosen randomly

(E) A controlled experiment where the observational units are assigned randomly

12. Moving times (in minutes) and weights (in pounds) were recorded for a random sample of 20 moving jobs requiring three-man crews, and the results of the regression analysis are shown below.

Predictor	Coef	StDev	T	P
Constant	21.84	25.54	0.86	0.404
Weight	0.036538	0.002977	12.27	0.000

$S = 30.32$ $R - Sq = 89.3\%$ $R - Sq(adj) = 88.7\%$

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	138434	138434	150.60	0.000
Residual Error	18	16546	919		
Total	19	154980			

The equation for the least squares regression line is

(A) $\widehat{Weight} = 21.84 + 0.037(Time)$.

(B) $\widehat{Time} = 21.84 + 0.037(Weight)$.

(C) $\widehat{Weight} = 25.54 + 0.003(Time)$.

(D) $\widehat{Time} = 25.54 + 0.003(Weight)$.

(E) $\widehat{Time} = 0.037 + 21.84(Weight)$.

13. Which of the following is *not* a condition for a geometric setting?
    (A) There are only two possible outcomes for each trial.
    (B) The probability of success is the same for each trial.
    (C) The trials are independent.
    (D) There are a fixed number of observations.
    (E) The variable of interest is the number of trials required to reach the first success.

14. Two random samples of American adults are taken, and the religious affil-
iations of the individuals involved are recorded. In the first sample of 200
adults, 66 of the individuals are Christians. In the second sample of 140
adults, 12 of the individuals are Buddhists. Assume the two samples are
independent. Which of the following should be used to construct a 95%
confidence interval for the difference in proportions for adult Americans
who practice the two religions?

(A) $0.0786 \pm 1.96\sqrt{0.0005}$

(B) $0.2443 \pm 1.96\sqrt{0.0017}$

(C) $0.33 \pm 1.96\sqrt{0.0011}$

(D) The conditions necessary for computing a confidence interval
have not been met; therefore, a confidence interval should not be
computed.

(E) Because the sample sizes for the two proportions are not equal, a
confidence interval cannot be computed.

15. For a set of values, suppose the mean is 10 and the standard deviation is
2. If each value is multiplied by 9, what will be the mean and standard
deviation for this new set of values?

(A) mean 10; standard deviation 2

(B) mean 10; standard deviation 18

(C) mean 90; standard deviation 2

(D) mean 90; standard deviation 6

(E) mean 90; standard deviation 18

16. Two measures, x and y, are taken on numerous subjects, and a least
squares regression equation is computed.

The resulting equation is: $\hat{y} = 382.1 - 12.25x$. A correct interpretation
for the slope and intercept is

(A) for every increase of 100 units in x, y increases approximately 1225
units; when $x = 0$, y is predicted to be 382.1.

(B) for every increase of 100 units in x, y decreases approximately 1225
units; when $x = 0$, y is predicted to be 382.1.

(C) for every increase of 100 units in x, y increases approximately
32,810 units; when $x = 0$, y is predicted to be 12.25.

(D) for every increase of 100 units in x, y decreases approximately
32,810 units; when $x = 0$, y is predicted to be 12.25.

(E) for every increase of 100 units in x, y increases approximately
32,810 units; when $x = 0$, y is predicted to be -12.25.

17. High school students on a closed campus recently petitioned their school board to allow students to leave the campus for lunch. In order to support their opinion, the students randomly polled students and teachers with the following question: "Do you think that students should be allowed to leave campus for lunch?" The results are as follows:

	Agree	Disagree	No Opinion	Total
Students	123	37	4	164
Teachers	16	3	3	22
Total	139	40	7	186

Which of the following best describes the responses of students and teachers on the issue?

(A) There is insufficient evidence that students and teachers have different opinions on the issue.

(B) There is evidence that students and teachers have different opinions on the issue at the 0.10 level but not at the 0.05 level.

(C) There is evidence that students and teachers have different opinions on the issue at the 0.05 level but not at the 0.01 level.

(D) There is evidence that students and teachers have different opinions on the issue at the 0.01 level but not at the 0.001 level.

(E) The conditions for conducting an appropriate test of homogeneity between students and teachers on the issue have not been met.

18. A random sample of fireworks shows was selected, and the number of shells used for each show (Shells), along with the length of the show (Length), were recorded. The following output was generated:

Bivariate Fit of Length By Shells

Linear Fit
Length = 20.162164 + 0.0002513 Shells

Summary of Fit
RSquare	0.073444
RSquare Adj	0.021969
Root Mean Square Error	5.116423
Mean of Response	22.85
Observations (or Sum Wgts)	20

What is the correlation between the number of shells and the length of the show?

(A) 0.022

(B) 0.073

(C) 0.148

(D) 0.271

(E) Not enough information is given to determine the correlation.

19. Two friends become roommates. Before deciding whether or not to combine their grocery shopping, they examine a random sample of previous weekly grocery bills for each to determine whether one spends significantly more money on groceries than the other. Assume all conditions for conducting a significance test have been met. The results of the test are:

H_0: Population mean of roommate A *equals that* of roommate B

H_a: Population mean of roommate A is *greater than that* of roommate B

	Roommate A	Roommate B
Count:	10	10
Mean:	38	32
Std dev:	8.56	8.56
Std error:	2.70	2.70

Using **unpooled variances**

Student's t:	1.567
df:	18
P-value:	0.067

Based upon the results of the test, which of the following conclusions should the roommates make?

(A) The results show that roommate A spends more than roommate B approximately 6.7% of the time.

(B) The results show that roommate A spends more than roommate B approximately 93.3% of the time.

(C) The results show that roommate A spends more than roommate B at the 0.10 level. If the null hypothesis is true, one could expect to get a test statistic at least as extreme as that observed 6.7% of the time.

(D) The results show that roommate A spends more than roommate B at the 0.10 level. If the null hypothesis is true, one could expect to get a test statistic at least as extreme as that observed 93.3% of the time.

(E) The results do not show that roommate A spends more than roommate B at any of the commonly accepted significance levels.

20. In a game of chance, three fair coins are tossed simultaneously. If all three coins show heads, then the player wins $15. If all three coins show tails, then the player wins $10. If it costs $5 to play the game, what is the player's expected net gain or loss at the end of two games?

(A)   The player can expect to gain $15 after two games.

(B)   The player can expect to gain $1.88 after two games.

(C)   The player can expect to gain $3.75 after two games.

(D)   The player can expect to lose $1.88 after two games.

(E)   The player can expect to lose $3.75 after two games.