STATISTICS/GRACEY Name_____
REVIEW FOR FINAL

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use common sense to determine whether the given event is impossible; possible, but very unlikely; or possible and likely.

1) Luis and his sister both won more than a million dollars in lotteries last year 1) _____
   A) Possible and likely
   B) Possible, but very unlikely
   C) Impossible

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

2) An article stated that last year 807 people taking a certain medication suffered from serious side effects while this year, after the medication had been modified, only 391 suffered serious side effects. What information is missing? Why would it be important to include this information? 2) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the given value is a statistic or a parameter.

3) After taking the first exam, 15 of the students dropped the class. 3) _____
   A) Statistic B) Parameter

Determine whether the given value is from a discrete or continuous data set.

4) The height of 2–year–old maple tree is 28.3 ft. 4) _____
   A) Continuous B) Discrete

Determine which of the four levels of measurement (nominal, ordinal, interval, ratio) is most appropriate.

5) The sample of spheres categorized from softest to hardest. 5) _____
   A) Interval B) Ratio C) Nominal D) Ordinal

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Identify the sample and population. Also, determine whether the sample is likely to be representative of the population.

6) An employee at the local ice cream parlor asks three customers if they like chocolate ice cream. 6) _____

Use critical thinking to address the key issue.

7) An airline company advertises that 100% of their flights are on time after checking 5 randomly selected flights and finding that these 5 were on time. 7) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Perform the requested conversions. Round decimals to the nearest thousandth and percents to the nearest tenth of a percent, if necessary.

8) Convert 2.5 to an equivalent fraction and percent. 8) _____
   A) $2\frac{1}{2}$, 250% B) 2, 25% C) 2, 250% D) $2\frac{1}{2}$, 25%

Solve the problem.

9) Alex and Juana went on a 116–mile canoe trip with their class. On the first day they traveled 29 miles. What percent of the total distance did they canoe? 9) _____

A) 25% B) 0.25% C) 400% D) 4%

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

10) An advertisement for a heating pad says that it can reduce back pain by 200%. What is wrong with this statement? 10) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the given description corresponds to an observational study or an experiment.

11) A marketing firm does a survey to find out how many people use a product. Of the one hundred people contacted, fifteen said they use the product. 11) _____

A) Experiment B) Observational study

12) A quality control specialist compares the output from a machine with a new lubricant to the output of machines with the old lubricant. 12) _____

A) Observational study B) Experiment

Identify which of these types of sampling is used: random, stratified, systematic, cluster, convenience.

13) 49, 34, and 48 students are selected from the Sophomore, Junior, and Senior classes with 496, 348, and 481 students respectively. 13) _____

A) Systematic
B) Convenience
C) Stratified
D) Cluster
E) Random

14) A pollster uses a computer to generate 500 random numbers, then interviews the voters corresponding to those numbers. 14) _____

A) Cluster
B) Random
C) Stratified
D) Convenience
E) Systematic

15) An education researcher randomly selects 48 middle schools and interviews all the teachers at each school. 15) _____

A) Stratified
B) Cluster
C) Convenience
D) Random
E) Systematic

Provide an appropriate response.

16) An electronics store receives a shipment of eight boxes of calculators. Each box contains ten calculators. A quality control inspector chooses a box by putting eight identical slips of paper numbered 1 to 8 into a hat, mixing thoroughly and then picking a slip at random. He then chooses a calculator at random from the box selected using a similar method with ten slips of paper in a hat. He repeats the process until he obtains a sample of 5 calculators for quality control testing. Does this sampling plan result in a random sample? Simple random sample? Explain. 16) _____

A) No; yes. The sample is not random because not all calculators have the same chance of being selected. It is a simple random sample because all samples of 5 calculators have the same chance of being selected.

B) Yes; no. The sample is random because all calculators have the same chance of being selected. It is not a simple random sample because some samples are not possible, such as a sample containing 5 calculators from the same box.

C) No; no. The sample is not random because not all calculators have the same chance of being selected. It is not a simple random sample because some samples are not possible, such as a sample containing 5 calculators from the same box.

D) Yes; yes. The sample is random because all calculators have the same chance of being selected. It is a simple random sample because all samples of 5 calculators have the same chance of being selected.

Identify the type of observational study (cross–sectional, retrospective, prospective).

17) A statistical analyst obtains data about ankle injuries by examining a hospital's records from the past 3 years. 17) _____

A) Retrospective B) Cross–sectional C) Prospective D) None of these

18) A researcher plans to obtain data by following those in cancer remission since January of 2005. 18) _____

A) Retrospective B) Cross–sectional C) Prospective D) None of these

Provide an appropriate response.

19) The scores on a recent statistics test are given in the frequency distribution below. Construct the corresponding relative frequency distribution. Round relative frequencies to the nearest hundredth of a percent if necessary. 19) _____

Scores	Frequency
0–60	4
61–70	9
71–80	10
81–90	5
91–100	5

A)

Scores	Relative Frequency
0–60	0.21%
61–70	0.18%
71–80	0.45%
81–90	0.06%
91–100	0.09%

B)

Scores	Relative Frequency
0–60	12.5%
61–70	20.1%
71–80	37.3%
81–90	15.2%
91–100	14.9%

C)

Scores	Relative Frequency
0–60	12.12%
61–70	27.27%
71–80	30.30%
81–90	15.15%
91–100	15.15%

D)

Scores	Relative Frequency
0–60	15.5%
61–70	22.1%
71–80	31.3%
81–90	16.2%
91–100	14.9%

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the given data to construct a frequency distribution.

20) On a math test, the scores of 24 students were 20) _____

95 73 77 69 77 77 95 81 77 67 88 73
73 88 77 73 88 77 73 81 73 88 81 69

Construct a frequency distribution. Use 4 classes beginning with a lower class limit of 60.

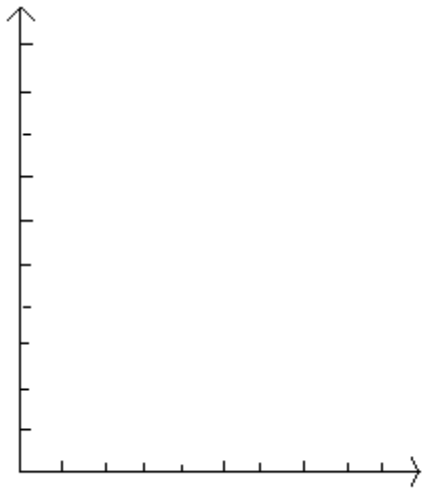
Score	Frequency

Provide an appropriate response.

21) The frequency table below shows the number of days off in a given year for 30 police detectives. 21) _____

Days off	Frequency
0–2	10
3–5	1
6–8	7
9–11	7
12–14	1
15–17	4

Construct a histogram. Use the class midpoints for the horizontal scale. Does the result appear to be a normal distribution? Why or why not?

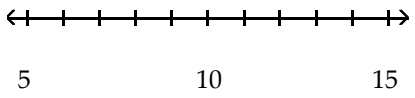


MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

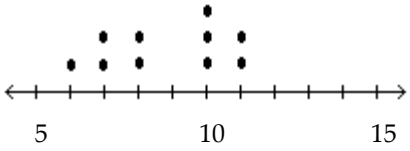
Construct the dotplot for the given data.

22) A store manager counts the number of customers who make a purchase in his store each day. The data are as follows. 22) _____

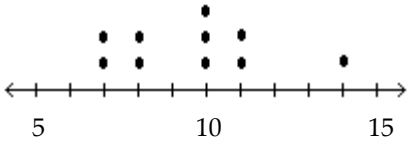
10 11 8 14 7 10 10 11 8 7



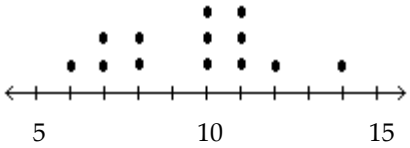
A)



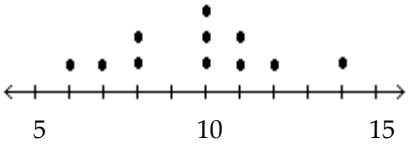
B)



C)



D)



Use the data to create a stemplot.

23) The midterm test scores for the seventh-period typing class are listed below. 23) _____

85 77 93 91 74 65 68 97 88 59 74 83 85 72 63 79

A)

5	9
6	3 5 8
7	2 4 4 7 9
8	3 5 5 8
9	1 3 7

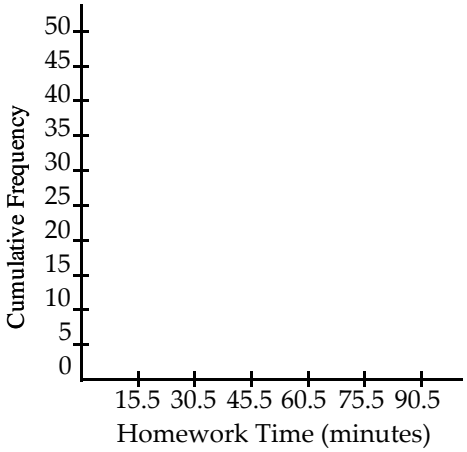
B)

5	9
6	3 5 8
7	3 5 5 8
8	2 4 4 7 9
9	1 3 7

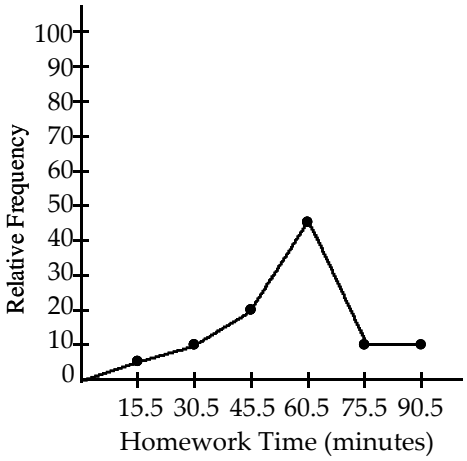
Provide an appropriate response.

24) The table contains data from a study of daily study time for 40 students from Statistics 101. Construct an ogive from the data. 24) _____

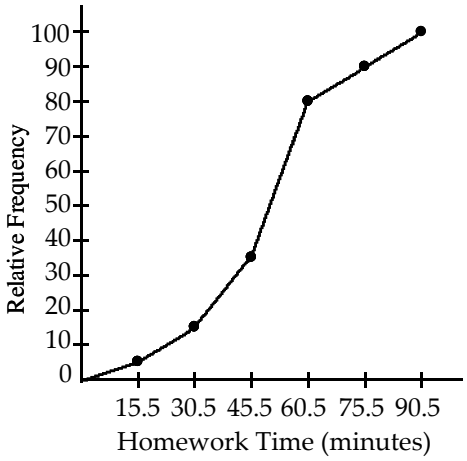
Minutes on homework	Number of students	Relative frequency	Cumulative frequency
0–15	2	0.05	2
16–30	4	0.10	6
31–45	8	0.20	14
46–60	18	0.45	32
61–75	4	0.10	36
76–90	4	0.10	40



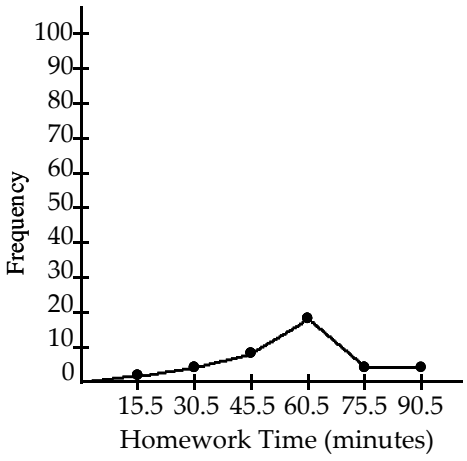
A)



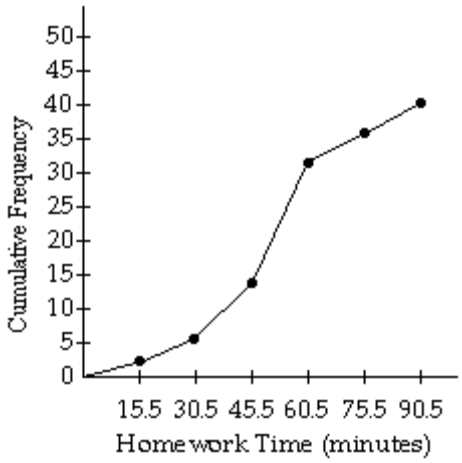
B)



C)

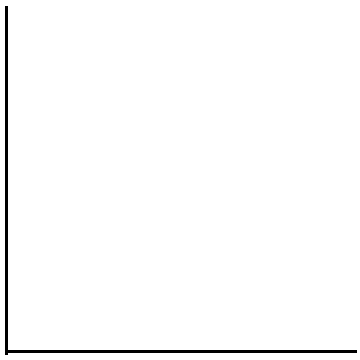


D)

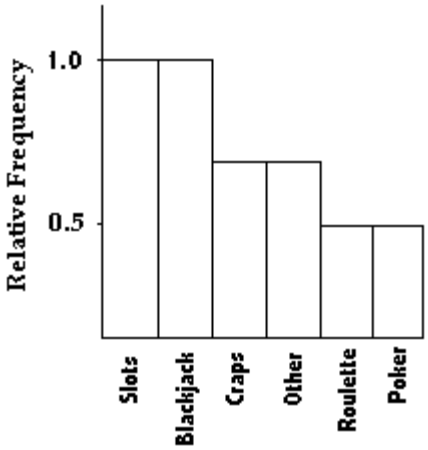


Solve the problem.

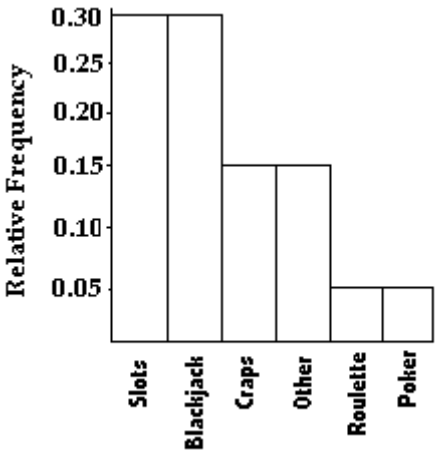
25) 240 casino patrons, were interviewed as they left the casino. 72 of them said they spent most of the time playing the slots. 72 of them said they played blackjack. 36 said they played craps. 12 said roulette. 12 said poker. The rest were not sure what they played the most. Construct a Pareto chart to depict the gaming practices of the group of casino goers. Choose the vertical scale so that the relative frequencies are represented. 25) _____



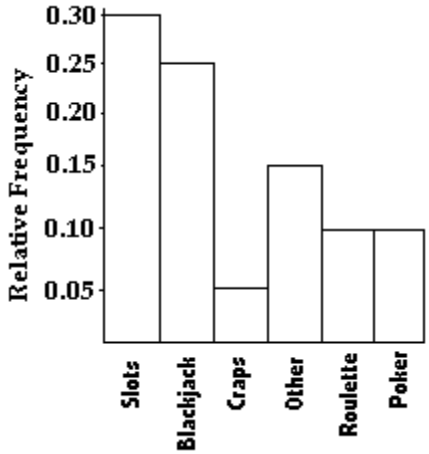
A)


Relative Frequency
1.0
0.5
Slots
Blackjack
Craps
Other
Roulette
Poker

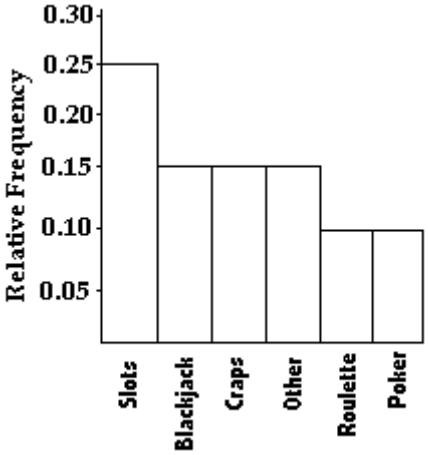
B)


Relative Frequency
0.30
0.25
0.20
0.15
0.10
0.05
Slots
Blackjack
Craps
Other
Roulette
Poker

C)


Relative Frequency
0.30
0.25
0.20
0.15
0.10
0.05
Slots
Blackjack
Craps
Other
Roulette
Poker

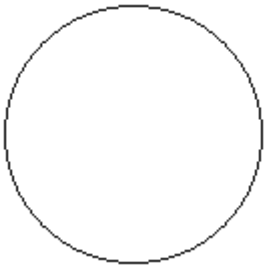
D)


Relative Frequency
0.30
0.25
0.20
0.15
0.10
0.05
Slots
Blackjack
Craps
Other
Roulette
Poker

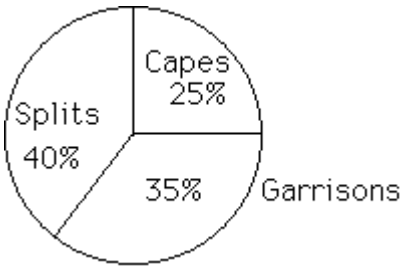
Construct a pie chart representing the given data set.

26) The following data give the distribution of the types of houses in a town containing 24,000 houses. 26) _____

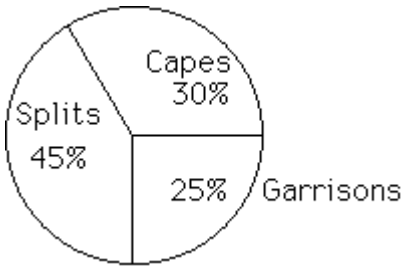
Capes	Garrisons	Splits
6000	8400	9600



A)

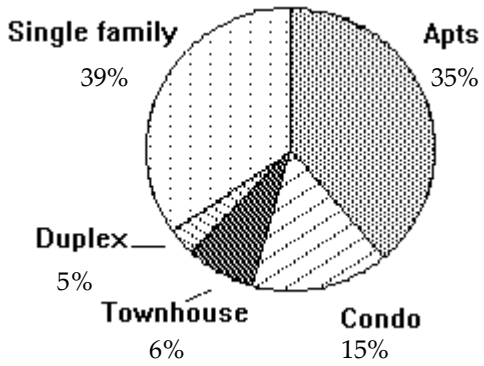


B)



Use the pie chart to solve the problem.

27) The pie chart shows the percent of the total population of 61,100 of Springfield living in the given types of housing. Round your result to the nearest whole number. 27) _____



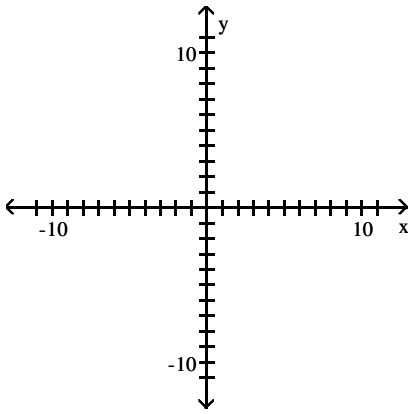
Find the number of people who live in condos.

A) 9165 people B) 12,220 people C) 51,935 people D) 15 people

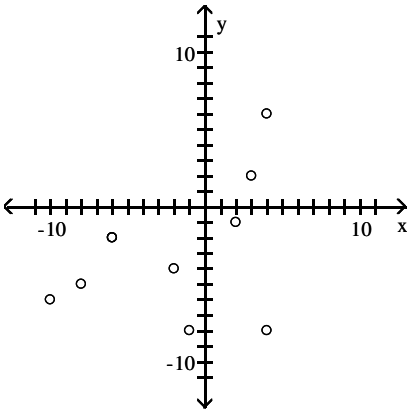
Use the given paired data to construct a scatterplot.

28) x −2 −8 −5 −1 −8 2 −6 6 −4 −2
y −6 −1 −8 2 4 3 −10 4 −2 −6

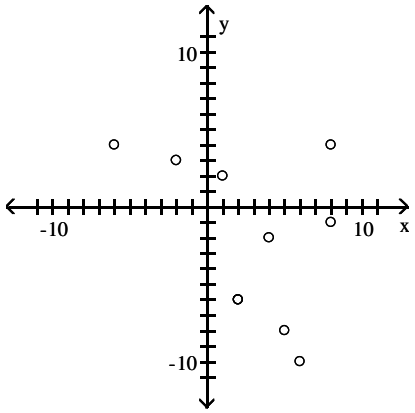
28) _____



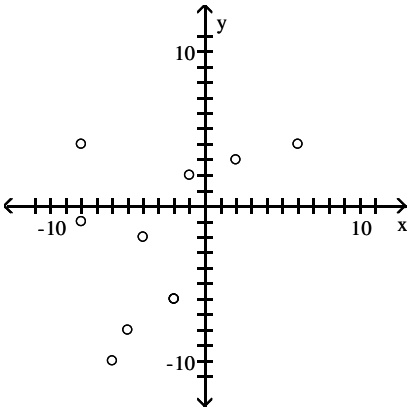
A)



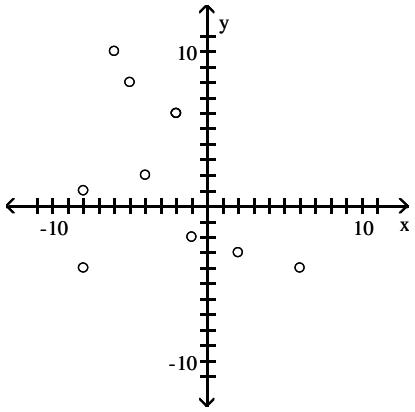
B)



C)



D)

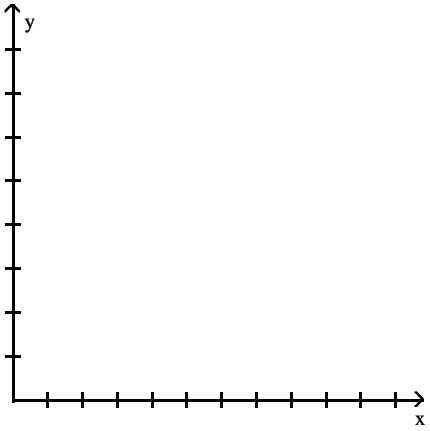


SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

29) Use the high closing values of Naristar Inc. stock from the years 1992 – 2003 to construct a time–series graph. (Let x = 0 represent 1992 and so on.) Identify a trend. 29) _____

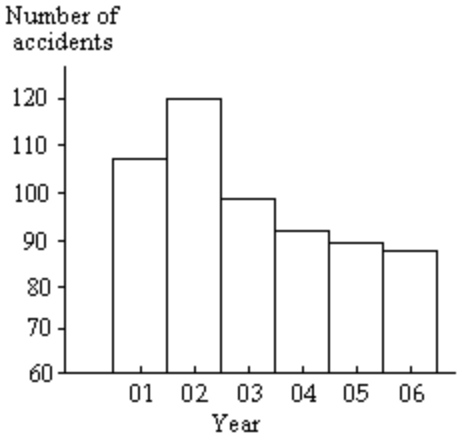
Year	High	Year	High
1992	48	1998	62
1993	53	1999	60
1994	47	2000	68
1995	55	2001	42
1996	58	2002	51
1997	61	2003	78



30) An annual survey sent to retail store managers contained the question "Did your store suffer any losses due to employee theft?" The responses are summarized in the table for two years, 2000 and 2005. Construct a multiple bar graph of the data, then describe any trends. 30) _____

Employee Theft	Percentage in 2000	Percentage in 2005
Yes	49	32
No	51	68
Totals	100	100

31) The graph below shows the number of car accidents occurring in one city in each of the years 2001 through 2006. The number of accidents dropped in 2003 after a new speed limit was imposed. Does the graph distort the data? How would you redesign the graph to be less misleading? 31) _____



MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the mean for the given sample data. Unless indicated otherwise, round your answer to one more decimal place than is present in the original data values.

32) Andrew asked seven of his friends how many cousins they had. The results are listed below. Find the mean number of cousins. 32) _____

18 10 7 14 4 3 8

A) 9.1 cousins B) 10.7 cousins C) 10.6 cousins D) 8.6 cousins

Find the median for the given sample data.

33) A store manager kept track of the number of newspapers sold each week over a seven-week period. The results are shown below. 33) _____

36 30 201 152 278 242 230

Find the median number of newspapers sold.

A) 230 newspapers B) 167 newspapers

C) 201 newspapers D) 152 newspapers

Find the mode(s) for the given sample data.

34) 77 52 32 52 29 77 34) _____

A) 52 B) 53.2 C) 77 D) 77, 52

Find the midrange for the given sample data.

35) 49 52 52 52 74 67 55 55 35) _____

A) 61.5 B) 12.5 C) 25 D) 53.5

36) The weights (in ounces) of 18 cookies are shown. Find the midrange. 36) _____

0.63 1.28 0.87 0.99 0.81 1.43
1.28 1.20 0.63 1.45 1.37 1.08
1.37 1.45 0.81 1.37 0.99 0.87

A) 1.130 oz B) 1.040 oz C) 1.08 oz D) 1.030 oz

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Find the mean and median for each of the two samples, then compare the two sets of results.

37) A comparison is made between summer electric bills of those who have central air and those who have window units. 37) _____

	May	June	July	Aug	Sept
Central	$32	$64	$80	$90	$65
Window	$15	$84	$99	$120	$40

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the mean of the data summarized in the given frequency distribution.

38) The test scores of 40 students are summarized in the frequency distribution below. Find the mean score. 38) _____

Score	Students
50–59	7
60–69	5
70–79	10
80–89	6
90–99	12

A) 77.3 B) 69.6 C) 74.5 D) 73.4

Solve the problem.

39) A student earned grades of B, B, A, C, and D. Those courses had these corresponding numbers of credit hours: 4, 5, 1, 5, 4. The grading system assigns quality points to letter grades as follows: A = 4, B = 3, C = 2, D = 1, and F = 0. Compute the grade point average (GPA) and round the result to two decimal places. 39) _____

A) 9.00 B) 1.37 C) 3.46 D) 2.37

Find the range for the given sample data.

40) Jorge has his own business as a painter. The amounts he made in the last five months are shown below. 40) _____

$2446 $2498 $1566 $2041 $1134

A) $880 B) $1364 C) $932 D) $1312

Find the variance for the given data. Round your answer to one more decimal place than the original data.

41) –7 7 10 –8 4 41) _____

A) 67.7 B) 67.6 C) 54.2 D) 68.0

Find the standard deviation for the given sample data. Round your answer to one more decimal place than is present in the original data.

42) Christine is currently taking college astronomy. The instructor often gives quizzes. On the past seven quizzes, Christine got the following scores: 42) _____

54 20 36 23 15 40 59

A) 36 B) 8715.6 C) 10,447 D) 17

Find the standard deviation of the data summarized in the given frequency distribution.

43) The heights of a group of professional basketball players are summarized in the frequency distribution below. Find the standard deviation. Round your answer to one decimal place. 43) _____

Height (in.)	Frequency
70–71	3
72–73	7
74–75	16
76–77	12
78–79	10
80–81	4
82–83	1

A) 3.2 in. B) 3.3 in. C) 2.8 in. D) 2.9 in.

Use the range rule of thumb to estimate the standard deviation. Round results to the nearest tenth.

44) The race speeds for the top eight cars in a 200–mile race are listed below. 44) _____

188.1 180.4 189.2 188.4 175.6 177.1 181.6 177.4

A) 6.8 B) 3.4 C) 1.1 D) 7.5

Use the empirical rule to solve the problem.

45) The amount of Jen's monthly phone bill is normally distributed with a mean of $74 and a standard deviation of $8. What percentage of her phone bills are between $50 and $98? 45) _____

A) 99.99% B) 99.7% C) 68% D) 95%

Solve the problem.

46) The ages of the members of a gym have a mean of 47 years and a standard deviation of 10 years. What can you conclude from Chebyshev's theorem about the percentage of gym members aged between 32 and 62? 46) _____

A) The percentage is approximately 33.3% B) The percentage is at least 55.6%

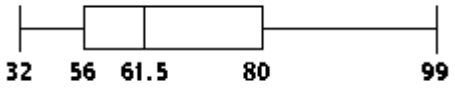
C) The percentage is at least 33.3% D) The percentage is at most 55.6%

Construct a boxplot for the given data. Include values of the 5-number summary in all boxplots.

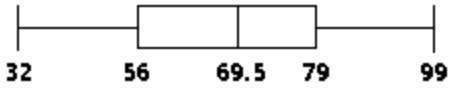
47) The test scores of 32 students are listed below. Construct a boxplot for the data set 47) _____

32 37 41 44 46 48 53 55
57 57 59 63 65 66 68 69
70 71 74 74 75 77 78 79
81 82 83 86 89 92 95 99

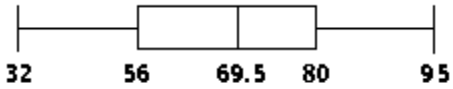
A)



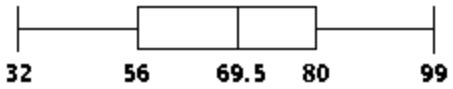
B)



C)



D)

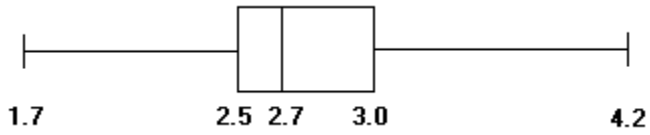


Construct a modified boxplot for the data. Identify any outliers.

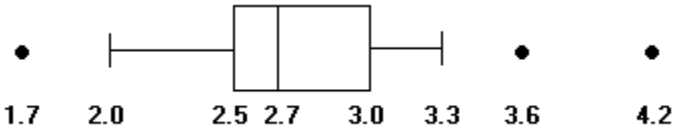
48) The weights (in ounces) of 27 tomatoes are listed below. 48) _____

1.7	2.0	2.2	2.2	2.4	2.5	2.5	2.5	2.6
2.6	2.6	2.7	2.7	2.7	2.8	2.8	2.8	2.9
2.9	2.9	3.0	3.0	3.1	3.1	3.3	3.6	4.2

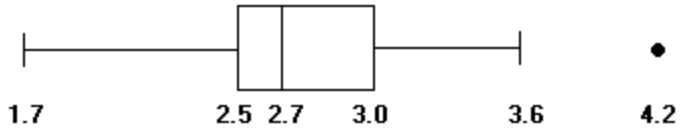
A) No outliers



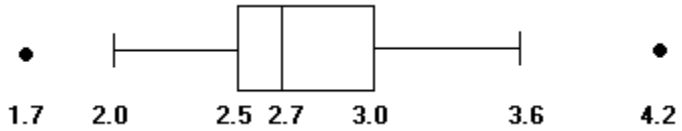
B) Outliers: 1.7 oz, 3.6 oz, 4.2 oz



C) Outlier: 4.2 oz



D) Outliers: 1.7 oz, 4.2 oz



Provide an appropriate response.

49) For data which are heavily skewed to the right, P_{10} is likely to be closer to the median than P_{90}. 49) _____

True or false?

A) False B) True

Express the indicated degree of likelihood as a probability value.

50) "You have one chance in ten of winning the race." 50) _____

A) 0.90 B) 1 C) 0.5 D) 0.10

Find the indicated probability.

51) A bag contains 6 red marbles, 3 blue marbles, and 5 green marbles. If a marble is randomly selected from the bag, what is the probability that it is blue? 51) _____

A) $\frac{1}{11}$ B) $\frac{1}{3}$ C) $\frac{3}{14}$ D) $\frac{1}{5}$

52) Refer to the table which summarizes the results of testing for a certain disease. 52) _____

	Positive Test Result	Negative Test Result
Subject has the disease	83	7
Subject does not have the disease	26	153

If one of the results is randomly selected, what is the probability that it is a false positive (test indicates the person has the disease when in fact they don't)? What does this probability suggest about the accuracy of the test?

A) 0.405; The probability of this error is high so the test is not very accurate.
B) 0.0967; The probability of this error is high so the test is not very accurate.
C) 0.145; The probability of this error is high so the test is not very accurate.
D) 0.0260; The probability of this error is low so the test is fairly accurate.

Estimate the probability of the event.

53) Of 1936 people who came into a blood bank to give blood, 200 people had high blood pressure. Estimate the probability that the next person who comes in to give blood will have high blood pressure. 53) _____

A) 0.071 B) 0.103 C) 0.022 D) 0.154

From the information provided, create the sample space of possible outcomes.

54) Two white mice mate. The male has both a white and a black fur–color gene. The female has only white fur–color genes. The fur color of the offspring depends on the pairs of fur–color genes that they receive. Assume that neither the white nor the black gene dominates. List the possible outcomes. 54) _____

A) WW, WW B) WW, BB C) WB, BW D) WW, BW

Find the indicated probability.

55) A spinner has equal regions numbered 1 through 15. What is the probability that the spinner will stop on an even number or a multiple of 3? 55) _____

A) $\frac{2}{3}$ B) 12 C) $\frac{1}{3}$ D) $\frac{7}{9}$

56) The table below describes the smoking habits of a group of asthma sufferers. 56) _____

	Nonsmoker	Occasional smoker	Regular smoker	Heavy smoker	Total
Men	389	36	83	37	545
Women	419	36	89	35	579
Total	808	72	172	72	1124

If one of the 1124 people is randomly selected, find the probability that the person is a man or a heavy smoker.

A) 0.514 B) 0.549 C) 0.483 D) 0.516

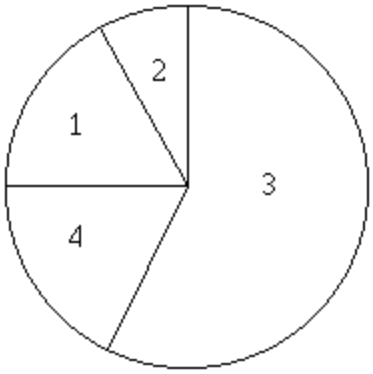
57) A 6–sided die is rolled. Find P(3 or 5). 57) _____

A) $\frac{1}{36}$ B) $\frac{1}{6}$ C) $\frac{1}{3}$ D) 2

58) A card is drawn from a well–shuffled deck of 52 cards. Find P(drawing a face card or a 4). 58) _____

A) $\frac{2}{13}$ B) $\frac{4}{13}$ C) 16 D) $\frac{12}{13}$

59) 100 employees of a company are asked how they get to work and whether they work full time or part time. The figure below shows the results. If one of the 100 employees is randomly selected, find the probability that the person drives alone or cycles to work. 59) _____



1. Public transportation: 7 full time, 10 part time
2. Bicycle: 4 full time, 5 part time
3. Drive alone: 29 full time, 31 part time
4. Carpool: 6 full time, 8 part time

A) 0.60 B) 0.33 C) 0.64 D) 0.69

60) In one town, 61% of adults have health insurance. What is the probability that 6 adults selected at random from the town all have health insurance? Round to the nearest thousandth if necessary. 60) _____

A) 3.66 B) 0.098 C) 0.052 D) 0.61

61) You are dealt two cards successively (without replacement) from a shuffled deck of 52 playing cards. Find the probability that both cards are black. Express your answer as a simplified fraction. 61) _____

A) $\frac{13}{51}$ B) $\frac{25}{102}$ C) $\frac{25}{51}$ D) $\frac{1}{2{,}652}$

62) The table below describes the smoking habits of a group of asthma sufferers. 62) _____

	Nonsmoker	Light smoker	Heavy smoker	Total
Men	402	35	42	479
Women	376	45	33	454
Total	778	80	75	933

If two different people are randomly selected from the 933 subjects, find the probability that they are both heavy smokers. Round to six decimal places.

A) 0.0001778 B) 0.002026 C) 0.006462 D) 0.006383

Find the indicated probability. Round to the nearest thousandth.

63) In a batch of 8,000 clock radios 6% are defective. A sample of 8 clock radios is randomly selected without replacement from the 8,000 and tested. The entire batch will be rejected if at least one of those tested is defective. What is the probability that the entire batch will be rejected? 63) _____

A) 0.0600 B) 0.610 C) 0.125 D) 0.390

64) In a blood testing procedure, blood samples from 3 people are combined into one mixture. The mixture will only test negative if all the individual samples are negative. If the probability that an individual sample tests positive is 0.1, what is the probability that the mixture will test positive? 64) _____

A) 0.271 B) 0.729 C) 0.999 D) 0.00100

Find the indicated probability. Express your answer as a simplified fraction unless otherwise noted.

65) The following table contains data from a study of two airlines which fly to Small Town, USA. 65) _____

	Number of flights which were on time	Number of flights which were late
Podunk Airlines	33	6
Upstate Airlines	43	5

If one of the 87 flights is randomly selected, find the probability that the flight selected arrived on time.

A) $\frac{43}{87}$ B) $\frac{76}{87}$

C) $\frac{11}{76}$ D) None of the above is correct.

66) The table below describes the smoking habits of a group of asthma sufferers. 66) _____

	Nonsmoker	Light smoker	Heavy smoker	Total
Men	327	83	65	475
Women	389	72	90	551
Total	716	155	155	1026

If one of the 1026 subjects is randomly selected, find the probability that the person chosen is a nonsmoker given that it is a woman. Round to the nearest thousandth.

A) 0.437 B) 0.706 C) 0.543 D) 0.379

Solve the problem.

67) The library is to be given 7 books as a gift. The books will be selected from a list of 16 titles. If each book selected must have a different title, how many possible selections are there? 67) _____

A) 268,435,456 B) 11,440 C) 57,657,600 D) 112

68) The organizer of a television show must select 5 people to participate in the show. The participants will be selected from a list of 24 people who have written in to the show. If the participants are selected randomly, what is the probability that the 5 youngest people will be selected? 68) _____

A) $\frac{1}{42,504}$ B) $\frac{1}{120}$ C) $\frac{1}{3}$ D) $\frac{1}{5,100,480}$

69) How many 3–digit numbers can be formed using the digits 1, 2, 3, 4, 5, 6, 7 if repetition of digits is not allowed? 69) _____

A) 343 B) 5 C) 6 D) 210

70) A class has 8 students who are to be assigned seating by lot. What is the probability that the students will be arranged in order from shortest to tallest? (Assume that no two students are the same height.) 70) _____

A) 0.00019841 B) 0.1000 C) 0.00024802 D) 0.0000248

Answer the question.

71) 12 wrestlers compete in a competition. If each wrestler wrestles one match with each other wrestler, what are the total numbers of matches? 71) _____

A) 66 B) 156 C) 132 D) 78

Identify the given random variable as being discrete or continuous.

72) The cost of a randomly selected orange 72) _____

A) Discrete B) Continuous

73) The height of a randomly selected student 73) _____

A) Continuous B) Discrete

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Determine whether the following is a probability distribution. If not, identify the requirement that is not satisfied.

74) 74) _____

x	P(x)
0	0.243
1	0.230
2	0.098
3	0.183
4	0.145
5	0.178

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the mean of the given probability distribution.

75) The number of golf balls ordered by customers of a pro shop has the following probability distribution. 75) _____

x	P(x)
3	0.14
6	0.25
9	0.36
12	0.15
15	0.10

A) $\mu = 8.46$ B) $\mu = 9$ C) $\mu = 9.06$ D) $\mu = 5.79$

76) The probabilities that a batch of 4 computers will contain 0, 1, 2, 3, and 4 defective computers are 0.5729, 0.3424, 0.0767, 0.0076, and 0.0003, respectively. Round answer to the nearest hundredth. 76) _____

A) $\mu = 2.00$ B) $\mu = 0.42$ C) $\mu = 0.52$ D) $\mu = 1.09$

Provide an appropriate response. Round to the nearest hundredth.

77) In a certain town, 70% of adults have a college degree. The accompanying table describes the probability distribution for the number of adults (among 4 randomly selected adults) who have a college degree. Find the standard deviation for the probability distribution. 77) _____

x	P(x)
0	0.0081
1	0.0756
2	0.2646
3	0.4116
4	0.2401

A) $\sigma = 2.95$ B) $\sigma = 0.84$ C) $\sigma = 0.92$ D) $\sigma = 1.06$

Answer the question.

78) Assume that there is a 0.05 probability that a sports playoff series will last four games, a 0.45 probability that it will last five games, a 0.45 probability that it will last six games, and a 0.05 probability that it will last seven games. Is it unusual for a team to win a series in 4 games? 78) _____

A) Yes B) No

Assume that a researcher randomly selects 14 newborn babies and counts the number of girls selected, x. The probabilities corresponding to the 14 possible values of x are summarized in the given table. Answer the question using the table.

Probabilities of Girls

x(girls)	P(x)	x(girls)	P(x)	x(girls)	P(x)
0	0.000	5	0.122	10	0.061
1	0.001	6	0.183	11	0.022
2	0.006	7	0.209	12	0.006
3	0.022	8	0.183	13	0.001
4	0.061	9	0.122	14	0.000

79) Find the probability of selecting 12 or more girls. 79) _____

A) 0.006 B) 0.022 C) 0.001 D) 0.007

80) Find the probability of selecting exactly 4 girls. 80) _____

A) 0.061 B) 0.001 C) 0.022 D) 0.122

81) Find the probability of selecting 2 or more girls. 81) _____

A) 0.999 B) 0.994 C) 0.001 D) 0.006

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

82) Ten apples, four of which are rotten, are in a refrigerator. Three apples are randomly selected without replacement. Let the random variable x represent the number chosen that are rotten. Construct a table describing the probability distribution, then find the mean and standard deviation for the random variable x. 82) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

83) Suppose you pay $2.00 to roll a fair die with the understanding that you will get back $4.00 for rolling a 2 or a 4, nothing otherwise. What is your expected value? 83) _____

A) –$0.67 B) –$2.00 C) $4.00 D) $2.00

84) The prizes that can be won in a sweepstakes are listed below together with the chances of winning each one: $3800 (1 chance in 8600); $1700 (1 chance in 5400); $700 (1 chance in 4600); $200 (1 chance in 2600). Find the expected value of the amount won for one entry if the cost of entering is 55 cents. 84) _____

A) $0.44 B) $0.47 C) $0.91 D) $200

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

85) Multiple–choice questions on a test each have 4 possible answers, one of which is correct. Assume that you guess the answers to 5 such questions. 85) _____

a. Use the multiplication rule to find the probability that the first 2 guesses are wrong and the last 3 guesses are correct. That is, find P(WWCCC), where C denotes a correct answer and W denotes a wrong answer.

b. Make a complete list of the different possible arrangements of 2 wrong answers and 3 correct answers, then find the probability for each entry in the list.

c. Based on the preceding results, what is the probability of getting exactly 3 correct answers when 5 guesses are made?

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Assume that a procedure yields a binomial distribution with a trial repeated n times. Use the binomial probability formula to find the probability of x successes given the probability p of success on a single trial. Round to three decimal places.

86) n =12, x = 5, p = 0.25 86) _____

A) 0.027 B) 0.103 C) 0.082 D) 0.091

Find the indicated probability. Round to three decimal places.

87) An airline estimates that 90% of people booked on their flights actually show up. If the airline books 71 people on a flight for which the maximum number is 69, what is the probability that the number of people who show up will exceed the capacity of the plane? 87) _____

A) 0.004 B) 0.022 C) 0.005 D) 0.001

88) A car insurance company has determined that 9% of all drivers were involved in a car accident last year. Among the 11 drivers living on one particular street, 3 were involved in a car accident last year. If 11 drivers are randomly selected, what is the probability of getting 3 or more who were involved in a car accident last year? 88) _____

A) 0.424 B) 0.057 C) 0.070 D) 0.943

Find the indicated probability.

89) An archer is able to hit the bull's–eye 50% of the time. If she shoots 8 arrows, what is the probability that she gets exactly 4 bull's–eyes? Assume each shot is independent of the others. 89) _____

A) 0.219 B) 0.0625 C) 0.273 D) 0.00391

90) Suppose that 11% of people are left handed. If 5 people are selected at random, what is the probability that exactly 2 of them are left handed? 90) _____

A) 0.0105 B) 0.171 C) 0.0853 D) 0.0121

Find the mean, μ, for the binomial distribution which has the stated values of n and p. Round answer to the nearest tenth

91) n = 2164; p = 0.63 91) _____

A) $\mu = 1358.0$ B) $\mu = 1367.0$ C) $\mu = 1363.3$ D) $\mu = 1354.8$

Find the standard deviation, σ, for the binomial distribution which has the stated values of n and p. Round your answer to the nearest hundredth.

92) n = 47; p = 3/5 92) _____

A) $\sigma = 0.95$ B) $\sigma = 3.36$ C) $\sigma = 7.48$ D) $\sigma = 6.63$

Solve the problem.

93) On a multiple choice test with 9 questions, each question has four possible answers, one of which is correct. For students who guess at all answers, find the mean for the number of correct answers. 93) _____

A) 4.5 B) 3 C) 2.3 D) 6.8

94) The probability is 0.6 that a person shopping at a certain store will spend less than $20. For groups of size 24, find the mean number who spend less than $20. 94) _____

A) 12.0 B) 8.0 C) 9.6 D) 14.4

95) On a multiple choice test with 18 questions, each question has four possible answers, one of which is correct. For students who guess at all answers, find the variance for the number of correct answers. 95) _____

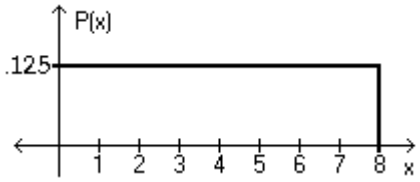
A) 11.4 B) 33.8 C) 3.4 D) 1.8

Determine if the outcome is unusual. Consider as unusual any result that differs from the mean by more than 2 standard deviations. That is, unusual values are either less than $\mu - 2\sigma$ or greater than $\mu + 2\sigma$.

96) A survey for brand recognition is done and it is determined that 68% of consumers have heard of Dull Computer Company. A survey of 800 randomly selected consumers is to be conducted. For such groups of 800, would it be unusual to get 595 consumers who recognize the Dull Computer Company name? 96) _____

A) Yes B) No

Using the following uniform density curve, answer the question.



97) What is the probability that the random variable has a value greater than 4? 97) _____

A) 0.450 B) 0.625 C) 0.500 D) 0.375

98) What is the probability that the random variable has a value less than 7.4? 98) _____

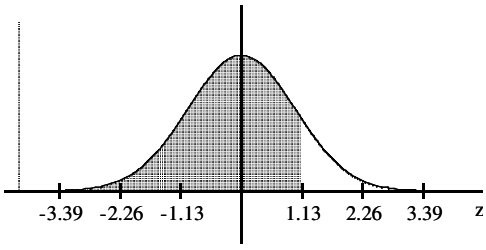
A) 1.0500 B) 0.6750 C) 0.9250 D) 0.8000

99) What is the probability that the random variable has a value between 0.1 and 6.2? 99) _____

A) 0.8875 B) 1.0125 C) 0.7625 D) 0.6375

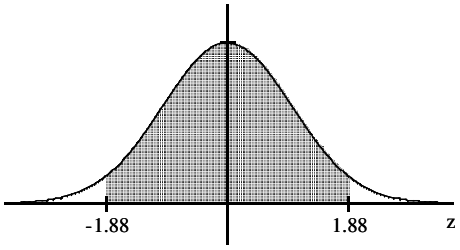
Find the area of the shaded region. The graph depicts the standard normal distribution with mean 0 and standard deviation 1.

100) 100) _____



A) 0.8485 B) 0.8708 C) 0.8907 D) 0.1292

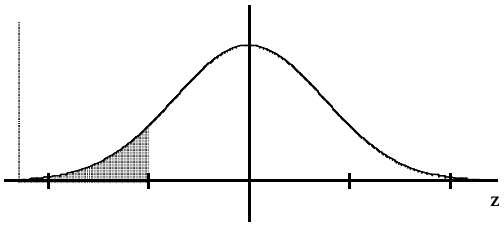
101) 101) _____



A) 0.9699 B) 0.0301 C) 0.9398 D) 0.0602

Find the indicated z score. The graph depicts the standard normal distribution with mean 0 and standard deviation 1

102) Shaded area is 0.0901. 102) _____



A) –1.26 B) –1.45 C) –1.39 D) –1.34

If z is a standard normal variable, find the probability.

103) The probability that z lies between –0.55 and 0.55 103) _____

A) –0.4176 B) –0.9000 C) 0.4176 D) 0.9000

104) P(z > 0.59) 104) _____

A) 0.2224 B) 0.7224 C) 0.2190 D) 0.2776

105) P(–0.73 < z < 2.27) 105) _____

A) 0.7557 B) 1.54 C) 0.4884 D) 0.2211

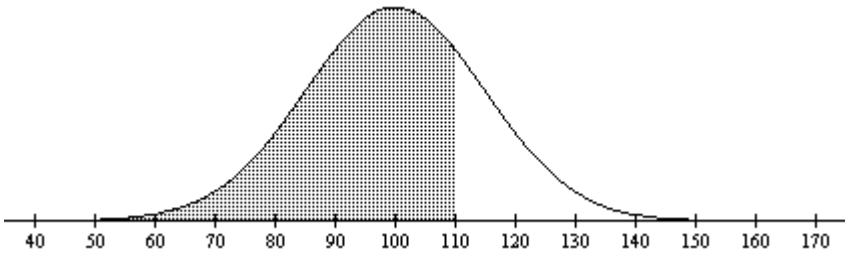
Find the indicated value.

106) $z_{0.05}$ 106) _____

A) 1.545 B) 1.755 C) 1.645 D) 1.325

Provide an appropriate response.

107) Find the area of the shaded region. The graph depicts IQ scores of adults, and those scores are normally distributed with a mean of 100 and a standard deviation of 15 (as on the Wechsler test). 107) _____



A) 0.6293 B) 0.8051 C) 0.4400 D) 0.7486

108) Find the IQ score separating the top 14% from the others. 108) _____

A) 83.7 B) 104.7 C) 99.8 D) 116.2

Solve the problem. Round to the nearest tenth unless indicated otherwise.

109) A bank's loan officer rates applicants for credit. The ratings are normally distributed with a mean of 200 and a standard deviation of 50. Find P_{60}, the score which separates the lower 60% from the top 40%. 109) _____

A) 212.5 B) 211.3 C) 207.8 D) 187.5

110) The serum cholesterol levels for men in one age group are normally distributed with a mean of 178.1 and a standard deviation of 40.9. All units are in mg/100 mL. Find the two levels that separate the top 9% and the bottom 9%. 110) _____

A) 123.3 mg/100mL and 232.9 mg/100mL B) 161.3 mg/100mL and 194.9 mg/100mL
C) 165.0 mg/100mL and 191.19 mg/100mL D) 106.9 mg/100mL and 249.3 mg/100mL

Find the indicated probability.

111) The incomes of trainees at a local mill are normally distributed with a mean of $1100 and a standard deviation of $150. What percentage of trainees earn less than $900 a month? 111) _____

A) 35.31% B) 40.82% C) 90.82% D) 9.18%

112) The weekly salaries of teachers in one state are normally distributed with a mean of $490 and a standard deviation of $45. What is the probability that a randomly selected teacher earns more than $525 a week? 112) _____

A) 0.7823 B) 0.2823 C) 0.2177 D) 0.1003

113) The lengths of human pregnancies are normally distributed with a mean of 268 days and a standard deviation of 15 days. What is the probability that a pregnancy lasts at least 300 days? 113) _____

A) 0.0179 B) 0.9834 C) 0.0166 D) 0.4834

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

114) A poll of 1700 randomly selected students in grades 6 through 8 was conducted and found that 37% enjoy playing sports. Is the 37% result a statistic or a parameter? Explain. 114) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

115) The amount of snowfall falling in a certain mountain range is normally distributed with a mean of 91 inches, and a standard deviation of 10 inches. What is the probability that the mean annual snowfall during 25 randomly picked years will exceed 93.8 inches? 115) _____

A) 0.5808 B) 0.0808 C) 0.4192 D) 0.0026

116) A bank's loan officer rates applicants for credit. The ratings are normally distributed with a mean of 200 and a standard deviation of 50. If 40 different applicants are randomly selected, find the probability that their mean is above 215. 116) _____

A) 0.3821 B) 0.4713 C) 0.0287 D) 0.1179

117) Assume that women's heights are normally distributed with a mean of 63.6 inches and a standard deviation of 2.5 inches. If 90 women are randomly selected, find the probability that they have a mean height between 62.9 inches and 64.0 inches. 117) _____

A) 0.9318 B) 0.7248 C) 0.1739 D) 0.0424

118) A final exam in Math 160 has a mean of 73 with standard deviation 7.8. If 24 students are randomly selected, find the probability that the mean of their test scores is greater than 71. 118) _____

A) 0.8962 B) 0.9012 C) 0.0008 D) 0.5036

For the binomial distribution with the given values for n and p, state whether or not it is suitable to use the normal distribution as an approximation.

119) n = 59 and p = 0.7 119) _____

A) Normal approximation is suitable. B) Normal approximation is not suitable.

120) n = 45 and p = 0.9 120) _____

A) Normal approximation is suitable. B) Normal approximation is not suitable.

Estimate the indicated probability by using the normal distribution as an approximation to the binomial distribution

121) A certain question on a test is answered correctly by 22% of the respondents. Estimate the probability that among the next 150 responses there will be at most 40 correct answers. 121) _____

A) 0.8997 B) 0.9306 C) 0.0694 D) 0.1003

122) In one county, the conviction rate for speeding is 85%. Estimate the probability that of the next 100 speeding summonses issued, there will be at least 90 convictions. 122) _____

A) 0.1038 B) 0.3962 C) 0.0420 D) 0.8962

Use the normal distribution to approximate the desired probability.

123) Find the probability that in 200 tosses of a fair die, we will obtain at least 40 fives. 123) _____

A) 0.0871 B) 0.3871 C) 0.1210 D) 0.2229

124) Merta reports that 74% of its trains are on time. A check of 60 randomly selected trains shows that 38 of them arrived on time. Find the probability that among the 60 trains, 38 or fewer arrive on time. Based on the result, does it seem plausible that the "on–time" rate of 74% could be correct? 124) _____

A) 0.0409, yes B) 0.0409, no C) 0.0316, yes D) 0.0316, no

Find the indicated critical z value.

125) Find the critical value $z_{\alpha/2}$ that corresponds to a 99% confidence level. 125) _____

A) 1.645 B) 2.33 C) 2.575 D) 1.96

Solve the problem.

126) The following confidence interval is obtained for a population proportion, p: $0.843 < p < 0.875$. Use these confidence interval limits to find the margin of error, E. 126) _____

A) 0.032 B) 0.859 C) 0.016 D) 0.017

Assume that a sample is used to estimate a population proportion p. Find the margin of error E that corresponds to the given statistics and confidence level. Round the margin of error to four decimal places.

127) 95% confidence; n = 250, x = 130 127) _____

A) 0.0650 B) 0.0743 C) 0.0557 D) 0.0619

128) 95% confidence; the sample size is 5700, of which 20% are successes 128) _____

A) 0.00780 B) 0.0104 C) 0.0137 D) 0.0120

129) In a clinical test with 1400 subjects, 420 showed improvement from the treatment. Find the margin of error for the 99% confidence interval used to estimate the population proportion. 129) _____

A) 0.0180 B) 0.0276 C) 0.0315 D) 0.0240

Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p.

130) n = 128, x = 61; 90% confidence 130) _____

A) $0.407 < p < 0.547$ B) $0.408 < p < 0.546$

C) $0.403 < p < 0.551$ D) $0.404 < p < 0.550$

Use the given data to find the minimum sample size required to estimate the population proportion.

131) Margin of error: 0.008; confidence level: 99%; $\hat{p}$ and $\hat{q}$ unknown 131) _____

A) 25,894 B) 15,900 C) 25,901 D) 26,024

132) Margin of error: 0.04; confidence level: 99%; from a prior study, $\hat{p}$ is estimated by 0.07. 132) _____

A) 156 B) 270 C) 324 D) 11

Solve the problem. Round the point estimate to the nearest thousandth.

133) 40 randomly picked people were asked if they rented or owned their own home, 18 said they rented. Obtain a point estimate of the proportion of home owners. 133) _____

A) 0.310 B) 0.450 C) 0.575 D) 0.550

Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p.

134) A survey of 865 voters in one state reveals that 408 favor approval of an issue before the legislature. Construct the 95% confidence interval for the true proportion of all voters in the state who favor approval. 134) _____

A) $0.435 < p < 0.508$ B) $0.444 < p < 0.500$

C) $0.438 < p < 0.505$ D) $0.471 < p < 0.472$

135) Of 123 adults selected randomly from one town, 26 of them smoke. Construct a 99% confidence interval for the true percentage of all adults in the town that smoke. 135) _____

A) $15.1\% < p < 27.2\%$ B) $12.6\% < p < 29.7\%$

C) $13.9\% < p < 28.4\%$ D) $11.7\% < p < 30.6\%$

Solve the problem.

136) In a certain population, body weights are normally distributed with a mean of 152 pounds and a standard deviation of 26 pounds. How many people must be surveyed if we want to estimate the percentage who weigh more than 180 pounds? Assume that we want 96% confidence that the error is no more than 3 percentage points. 136) _____

A) 411 B) 1168 C) 564 D) 890

Find the indicated critical z value.

137) Find the critical value $z_{\alpha/2}$ that corresponds to a 98% confidence level. 137) _____

A) 1.75 B) 2.05 C) 2.575 D) 2.33

Use the confidence level and sample data to find the margin of error E. Round your answer to the same number of decimal places as the sample mean unless otherwise noted.

138) Weights of eggs: 95% confidence; n = 45, $\bar{x}$ = 1.50 oz, σ = 0.20 oz 138) _____

A) 0.06 oz B) 0.44 oz C) 0.05 oz D) 0.01 oz

Use the confidence level and sample data to find a confidence interval for estimating the population μ. Round your answer to the same number of decimal places as the sample mean.

139) Test scores: $n = 76$, $\bar{x} = 46.1$, $\sigma = 5.7$; 98% confidence 139) _____

A) $44.4 < \mu < 47.8$ B) $45.0 < \mu < 47.2$ C) $44.8 < \mu < 47.4$ D) $44.6 < \mu < 47.6$

140) 48 packages are randomly selected from packages received by a parcel service. The sample has a mean weight of 10.1 pounds and a standard deviation of 2.9 pounds. What is the 95% confidence interval for the true mean weight, μ, of all packages received by the parcel service? 140) _____

A) 9.1 lb $< \mu <$ 11.1 lb B) 9.0 lb $< \mu <$ 11.2 lb

C) 9.3 lb $< \mu <$ 10.9 lb D) 9.4 lb $< \mu <$ 10.8 lb

Use the given information to find the minimum sample size required to estimate an unknown population mean μ.

141) How many women must be randomly selected to estimate the mean weight of women in one age group. We want 90% confidence that the sample mean is within 2.7 lb of the population mean, and the population standard deviation is known to be 22 lb. 141) _____

A) 256 B) 180 C) 181 D) 178

Do one of the following, as appropriate: (a) Find the critical value $z_{\alpha/2}$, (b) find the critical value $t_{\alpha/2}$, (c) state that neither the normal nor the t distribution applies.

142) 98%; $n = 7$; $\sigma = 27$; population appears to be normally distributed. 142) _____

A) $t_{\alpha/2} = 2.575$ B) $t_{\alpha/2} = 1.96$ C) $z_{\alpha/2} = 2.05$ D) $z_{\alpha/2} = 2.33$

143) 95%; $n = 11$; σ is known; population appears to be very skewed. 143) _____

A) $z_{\alpha/2} = 1.812$

B) $t_{\alpha/2} = 2.228$

C) $z_{\alpha/2} = 1.96$

D) Neither the normal nor the t distribution applies.

Assume that a sample is used to estimate a population mean μ. Use the given confidence level and sample data to find the margin of error. Assume that the sample is a simple random sample and the population has a normal distribution. Round your answer to one more decimal place than the sample standard deviation.

144) 95% confidence; $n = 91$; $\bar{x} = 24$, $s = 14.7$ 144) _____

A) 3.06 B) 5.26 C) 2.62 D) 2.75

Use the given degree of confidence and sample data to construct a confidence interval for the population mean μ. Assume that the population has a normal distribution.

145) A savings and loan association needs information concerning the checking account balances of its local customers. A random sample of 14 accounts was checked and yielded a mean balance of $664.14 and a standard deviation of $297.29. Find a 98% confidence interval for the true mean checking account balance for local customers. 145) _____

A) \$493.71 $< \mu <$ \$834.57 B) \$455.65 $< \mu <$ \$872.63

C) \$453.59 $< \mu <$ \$874.69 D) \$492.52 $< \mu <$ \$835.76

146) The football coach randomly selected ten players and timed how long each player took to perform a certain drill. The times (in minutes) were: 146) _____

7.5 10.3 9.3 8.1 11.1
7.9 6.9 11.4 10.7 12.2

Determine a 95% confidence interval for the mean time for all players.

A) 10.80 min < μ < 8.28 min
B) 10.90 min < μ < 8.18 min
C) 8.28 min < μ < 10.80 min
D) 8.18 min < μ < 10.90 min

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Identify the null hypothesis, alternative hypothesis, test statistic, P–value, conclusion about the null hypothesis, and final conclusion that addresses the original claim.

147) A manufacturer considers his production process to be out of control when defects exceed 3%. In a random sample of 85 items, the defect rate is 5.9% but the manager claims that this is only a sample fluctuation and production is not really out of control. At the 0.01 level of significance, test the manager's claim. 147) _____

148) An article in a journal reports that 34% of American fathers take no responsibility for child care. A researcher claims that the figure is higher for fathers in the town of Littleton. A random sample of 234 fathers from Littleton yielded 96 who did not help with child care. Test the researcher's claim at the 0.05 significance level. 148) _____

149) In a clinical study of an allergy drug, 108 of the 202 subjects reported experiencing significant relief from their symptoms. At the 0.01 significance level, test the claim that more than half of all those using the drug experience relief. 149) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the P–value for the indicated hypothesis test.

150) In a sample of 88 children selected randomly from one town, it is found that 8 of them suffer from asthma. Find the P–value for a test of the claim that the proportion of all children in the town who suffer from asthma is equal to 11%. 150) _____

A) –0.2843 B) 0.5686 C) 0.2843 D) 0.2157

151) An airline claims that the no–show rate for passengers booked on its flights is less than 6%. Of 380 randomly selected reservations, 18 were no–shows. Find the P–value for a test of the airline's claim. 151) _____

A) 0.0746 B) 0.1230 C) 0.3508 D) 0.1492

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Identify the null hypothesis, alternative hypothesis, test statistic, P–value, conclusion about the null hypothesis, and final conclusion that addresses the original claim.

152) The health of employees is monitored by periodically weighing them in. A sample of 54 employees has a mean weight of 183.9 lb. Assuming that σ is known to be 121.2 lb, use a 0.10 significance level to test the claim that the population mean of all such employees weights is less than 200 lb. 152) _____

153) A random sample of 100 pumpkins is obtained and the mean circumference is found to be 40.5 cm. Assuming that the population standard deviation is known to be 1.6 cm, use a 0.05 significance level to test the claim that the mean circumference of all pumpkins is equal to 39.9 cm. 153) _____

Test the given claim. Use the P–value method or the traditional method as indicated. Identify the null hypothesis, alternative hypothesis, test statistic, critical value(s) or P–value, conclusion about the null hypothesis, and final conclusion that addresses the original claim.

154) The mean resting pulse rate for men is 72 beats per minute. A simple random sample of men who regularly work out at Mitch's Gym is obtained and their resting pulse rates (in beats per minute) are listed below. Use a 0.05 significance level to test the claim that these sample pulse rates come from a population with a mean less than 72 beats per minute. Assume that the standard deviation of the resting pulse rates of all men who work out at Mitch's Gym is known to be 6.6 beats per minute. Use the traditional method of testing hypotheses. 154) _____

54 61 69 84 74 64 69
70 66 80 59 71 76 63

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the hypothesis test involves a sampling distribution of means that is a normal distribution, Student t distribution, or neither.

155) Claim: $\mu = 119$. Sample data: $n = 11$, $\bar{x} = 110$, $s = 15.2$. The sample data appear to come from a normally distributed population with unknown μ and σ. 155) _____

A) Normal B) Student t C) Neither

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Assume that a simple random sample has been selected from a normally distributed population. Find the test statistic, P–value, critical value(s), and state the final conclusion.

156) Test the claim that for the population of female college students, the mean weight is given by $\mu = 132$ lb. Sample data are summarized as $n = 20$, $\bar{x} = 137$ lb, and $s = 14.2$ lb. Use a significance level of $\alpha = 0.1$. 156) _____

Assume that a simple random sample has been selected from a normally distributed population and test the given claim. Use either the traditional method or P–value method as indicated. Identify the null and alternative hypotheses, test statistic, critical value(s) or P–value (or range of P–values) as appropriate, and state the final conclusion that addresses the original claim.

157) A large software company gives job applicants a test of programming ability and the mean for that test has been 160 in the past. Twenty–five job applicants are randomly selected from one large university and they produce a mean score and standard deviation of 183 and 12, respectively. Use a 0.05 level of significance to test the claim that this sample comes from a population with a mean score greater than 160. Use the P–value method of testing hypotheses. 157) _____

158) A cereal company claims that the mean weight of the cereal in its packets is 14 oz. The weights (in ounces) of the cereal in a random sample of 8 of its cereal packets are listed below. 158) _____

14.6 13.8 14.1 13.7 14.0 14.4 13.6 14.2

Test the claim at the 0.01 significance level.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Assume that you plan to use a significance level of $\alpha = 0.05$ to test the claim that $p_1 = p_2$. Use the given sample sizes and numbers of successes to find the pooled estimate $\bar{p}$. Round your answer to the nearest thousandth.

159) $n_1 = 100$ $n_2 = 100$ 159) _____

$x_1 = 33$ $x_2 = 36$

A) 0.241 B) 0.380 C) 0.310 D) 0.345

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the traditional method to test the given hypothesis. Assume that the samples are independent and that they have been randomly selected

160) A researcher finds that of 1000 people who said that they attend a religious service at least once a week, 31 stopped to help a person with car trouble. Of 1200 people interviewed who had not attended a religious service at least once a month, 22 stopped to help a person with car trouble. At the 0.05 significance level, test the claim that the two proportions are equal. 160) _____

161) Seven of 8500 people vaccinated against a certain disease later developed the disease. 18 of 10,000 people vaccinated with a placebo later developed the disease. Test the claim that the vaccine is effective in lowering the incidence of the disease. Use a significance level of 0.02. 161) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Construct the indicated confidence interval for the difference between population proportions $p_1 - p_2$. Assume that the samples are independent and that they have been randomly selected.

162) In a random sample of 300 women, 50% favored stricter gun control legislation. In a random sample of 200 men, 28% favored stricter gun control legislation. Construct a 98% confidence interval for the difference between the population proportions $p_1 - p_2$. 162) _____

A) $0.109 < p_1 - p_2 < 0.331$ B) $0.136 < p_1 - p_2 < 0.304$

C) $0.120 < p_1 - p_2 < 0.320$ D) $0.132 < p_1 - p_2 < 0.308$

Determine whether the samples are independent or dependent.

163) The effectiveness of a new headache medicine is tested by measuring the amount of time before the headache is cured for patients who use the medicine and another group of patients who use a placebo drug. 163) _____

A) Independent samples B) Dependent samples

164) The effectiveness of a headache medicine is tested by measuring the intensity of a headache in patients before and after drug treatment. The data consist of before and after intensities for each patient. 164) _____

A) Dependent samples B) Independent samples

165) The accuracy of verbal responses is tested in an experiment in which individuals report their heights and then are measured. The data consist of the reported height and measured height for each individual. 165) _____

A) Dependent samples B) Independent samples

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Test the indicated claim about the means of two populations. Assume that the two samples are independent simple random samples selected from normally distributed populations. Do not assume that the population standard deviations are equal. Use the traditional method or P–value method as indicated.

166) A researcher wishes to determine whether people with high blood pressure can reduce their blood pressure, measured in mm Hg, by following a particular diet. Use a significance level of 0.01 to test the claim that the treatment group is from a population with a smaller mean than the control group. Use the traditional method of hypothesis testing. 166) _____

Treatment Group	Control Group
$n_1 = 101$	$n_2 = 105$
$\bar{x}_1 = 120.5$	$\bar{x}_2 = 149.3$
$s_1 = 17.4$	$s_2 = 30.2$

167) A researcher wishes to determine whether the blood pressure of vegetarians is, on average, lower than the blood pressure of nonvegetarians. Independent simple random samples of 85 vegetarians and 75 nonvegetarians yielded the following sample statistics for systolic blood pressure: 167) _____

Vegetarians	Nonvegetarians
$n_1 = 85$	$n_2 = 75$
$\bar{x}_1 = 124.1$ mmHg	$\bar{x}_2 = 138.7$ mmHg
$s_1 = 38.7$ mmHg	$s_2 = 39.2$ mmHg

Use a significance level of 0.01 to test the claim that the mean systolic blood pressure of vegetarians is lower than the mean systolic blood pressure of nonvegetarians. Use the P–value method of hypothesis testing.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Construct the indicated confidence interval for the difference between the two population means. Assume that the two samples are independent simple random samples selected from normally distributed populations. Do not assume that the population standard deviations are equal.

168) Independent samples from two different populations yield the following data. $\bar{x}_1 = 260$, $\bar{x}_2 = 314$, $s_1 = 75$, $s_2 = 33$. The sample size is 399 for both samples. Find the 85% confidence interval for $\mu_1 - \mu_2$. 168) _____

A) $-55 < \mu_1 - \mu_2 < -53$
B) $-60 < \mu_1 - \mu_2 < -48$
C) $-70 < \mu_1 - \mu_2 < -38$
D) $-62 < \mu_1 - \mu_2 < -46$

State what the given confidence interval suggests about the two population means.

169) A researcher was interested in comparing the amount of time spent watching television by women and by men. Independent simple random samples of 14 women and 17 men were selected, and each person was asked how many hours he or she had watched television during the previous week. The summary statistics are as follows. 169) _____

Women	Men
$\bar{x}_1 = 11.9$ hrs	$\bar{x}_2 = 14.3$ hrs
$s_1 = 3.9$ hrs	$s_2 = 5.2$ hrs
$n_1 = 14$	$n_2 = 17$

The following 99% confidence interval was obtained for $\mu_1 - \mu_2$, the difference between the mean amount of time spent watching television for women and the mean amount of time spent watching television for men: $-7.33 \text{ hrs} < \mu_1 - \mu_2 < 2.53 \text{ hrs}$.

What does the confidence interval suggest about the population means?

A) The confidence interval includes only negative values which suggests that the mean amount of time spent watching television for women is smaller than the mean amount of time spent watching television for men.

B) The confidence interval limits include 0 which suggests that the two population means are unlikely to be equal. There appears to be a significant difference between the mean amount of time spent watching television for women and the mean amount of time spent watching television for men.

C) The confidence interval includes only positive values which suggests that the mean amount of time spent watching television for women is larger than the mean amount of time spent watching television for men.

D) The confidence interval limits include 0 which suggests that the two population means might be equal. There does not appear to be a significant difference between the mean amount of time spent watching television for women and the mean amount of time spent watching television for men.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Perform the indicated hypothesis test. Assume that the two samples are independent simple random samples selected from normally distributed populations. Also assume that the population standard deviations are equal ($\sigma_1 = \sigma_2$), so that the standard error of the difference between means is obtained by pooling the sample variances .

170) A researcher was interested in comparing the amount of time spent watching television by women and by men. Independent simple random samples of 14 women and 17 men were selected, and each person was asked how many hours he or she had watched television during the previous week. The summary statistics are as follows. 170) _____

Women	Men
$\bar{x}_1 = 11.6$ hr	$\bar{x}_2 = 16.9$ hr
$s_1 = 4.2$ hr	$s_2 = 4.3$ hr
$n_1 = 14$	$n_2 = 17$

Use a 0.05 significance level to test the claim that the mean amount of time spent watching television by women is smaller than the mean amount of time spent watching television by men. Use the traditional method of hypothesis testing.

171) A researcher was interested in comparing the GPAs of students at two different colleges. Independent simple random samples of 8 students from college A and 13 students from college B yielded the following GPAs. 171) _____

College A	College B
3.7	3.8 2.8
3.2	3.2 4.0
3.0	3.0 3.6
2.5	3.9 2.6
2.7	3.8 4.0
3.6	2.5 3.6
2.8	3.9
3.4	

Use a 0.10 significance level to test the claim that the mean GPA of students at college A is equal to the mean GPA of students at college B. Use the traditional method of hypothesis testing.
(Note: $\bar{x}_1 = 3.1125$, $\bar{x}_2 = 3.4385$, $s_1 = 0.4357$, $s_2 = 0.5485$.)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Construct the indicated confidence interval for the difference between the two population means. Assume that the two samples are independent simple random samples selected from normally distributed populations. Also assume that the population standard deviations are equal ($\sigma_1 = \sigma_2$), so that the standard error of the difference between means is obtained by pooling the sample variances .

172) A researcher was interested in comparing the amount of time spent watching television by women and by men. Independent simple random samples of 14 women and 17 men were selected and each person was asked how many hours he or she had watched television during the previous week. The summary statistics are as follows. 172) _____

Women	Men
$\bar{x}_1 = 12.6$ hr	$\bar{x}_2 = 16.5$ hr
$s_1 = 4.1$ hr	$s_2 = 4.7$ hr
$n_1 = 14$	$n_2 = 17$

Construct a 95% confidence interval for $\mu_1 - \mu_2$, the difference between the mean amount of time spent watching television for women and the mean amount of time spent watching television for men.

A) $-7.30 \text{ hrs} < \mu_1 - \mu_2 < -0.50 \text{ hrs}$
B) $-6.62 \text{ hrs} < \mu_1 - \mu_2 < -1.18 \text{ hrs}$
C) $-7.18 \text{ hrs} < \mu_1 - \mu_2 < -0.62 \text{ hrs}$
D) $-7.45 \text{ hrs} < \mu_1 - \mu_2 < -0.35 \text{ hrs}$

173) A paint manufacturer wanted to compare the drying times of two different types of paint. Independent simple random samples of 11 cans of type A and 9 cans of type B were selected and applied to similar surfaces. The drying times, in hours, were recorded. The summary statistics are as follows. 173) _____

Type A	Type B
$\bar{x}_1 = 70.8$ hr	$\bar{x}_2 = 67.6$ hr
$s_1 = 3.5$ hr	$s_2 = 3.2$ hr
$n_1 = 11$	$n_2 = 9$

Construct a 99% confidence interval for $\mu_1 - \mu_2$, the difference between the mean drying time for paint type A and the mean drying time for paint type B.

A) $-1.85 \text{ hrs} < \mu_1 - \mu_2 < 8.25 \text{ hrs}$
B) $-0.67 \text{ hrs} < \mu_1 - \mu_2 < 7.07 \text{ hrs}$
C) $0.17 \text{ hrs} < \mu_1 - \mu_2 < 6.23 \text{ hours}$
D) $-1.16 \text{ hrs} < \mu_1 - \mu_2 < 7.56 \text{ hrs}$

The two data sets are dependent. Find $\bar{d}$ to the nearest tenth.

174)

A	68	58	58	63	51
B	24	27	28	25	22

174) _____

A) 43.0 B) 20.6 C) 34.4 D) 44.7

Find s_d.

175) The differences between two sets of dependent data are 15, 27, 3, 3, 12. Round to the nearest tenth. 175) _____

A) 12.9 B) 19.8 C) 7.9 D) 9.9

Construct a confidence interval for μ_d, the mean of the differences d for the population of paired data. Assume that the population of paired differences is normally distributed.

176) A coach uses a new technique in training middle distance runners. The times for 9 different athletes to run 800 meters before and after this training are shown below. 176) _____

Athlete	A	B	C	D	E	F	G	H	I
Time before training (seconds)	115.2	120.9	108.0	112.4	107.5	119.1	121.3	110.8	122.3
Time after training (seconds)	116.0	119.1	105.1	111.9	109.1	115.2	118.5	110.7	120.9

Construct a 99% confidence interval for the mean difference of the "before" minus "after" times.

A) $-0.85 < \mu_d < 3.29$ B) $-0.76 < \mu_d < 3.20$

C) $-0.82 < \mu_d < 3.26$ D) $-0.54 < \mu_d < 2.98$

177) A test of abstract reasoning is given to a random sample of students before and after they completed a formal logic course. The results are given below. Construct a 95% confidence interval for the mean difference between the before and after scores. 177) _____

Before	74	83	75	88	84	63	93	84	91	77
After	73	77	70	77	74	67	95	83	84	75

A) $0.2 < \mu_d < 7.2$ B) $1.2 < \mu_d < 5.7$ C) $0.8 < \mu_d < 6.6$ D) $1.0 < \mu_d < 6.4$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the traditional method of hypothesis testing to test the given claim about the means of two populations. Assume that two dependent samples have been randomly selected from normally distributed populations.

178) Five students took a math test before and after tutoring. Their scores were as follows. 178) _____

Subject	A	B	C	D	E
Before	77	65	68	80	69
After	81	74	66	83	81

Using a 0.01 level of significance, test the claim that the tutoring has an effect on the math scores.

179) A coach uses a new technique to train gymnasts. 7 gymnasts were randomly selected and their competition scores were recorded before and after the training. The results are shown below. 179) _____

Subject	A	B	C	D	E	F	G
Before	9.5	9.4	9.5	9.4	9.6	9.4	9.5
After	9.6	9.6	9.5	9.3	9.7	9.7	9.3

Using a 0.01 level of significance, test the claim that the training technique is effective in raising the gymnasts' scores.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Given the linear correlation coefficient r and the sample size n, determine the critical values of r and use your finding to state whether or not the given r represents a significant linear correlation. Use a significance level of 0.05.

180) r = 0.41, n = 25 180) _____

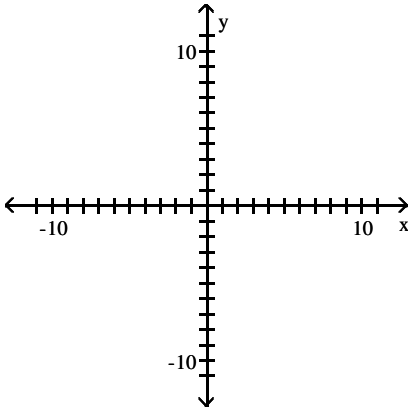
A) Critical values: r = ±0.487, no significant linear correlation
B) Critical values: r = ±0.396, significant linear correlation
C) Critical values: r = ±0.487, significant linear correlation
D) Critical values: r = ±0.396, no significant linear correlation

Construct a scatterplot for the given data.

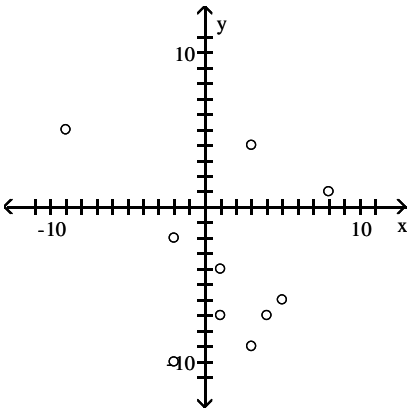
181)

x	−3	−1	−4	−8	−3	2	2	9	−5	−1
y	−9	−7	−7	1	4	−2	−10	5	−6	−4

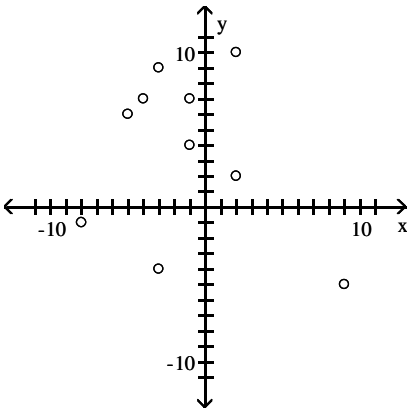
181) _____



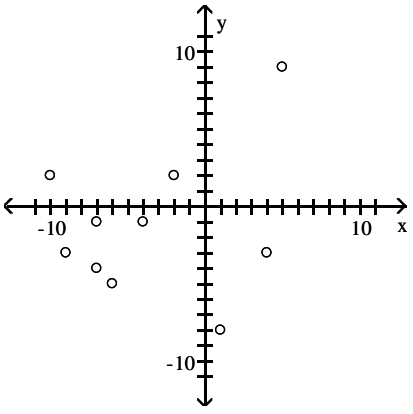
A)



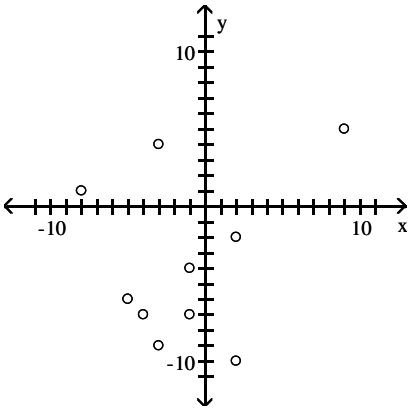
B)



C)

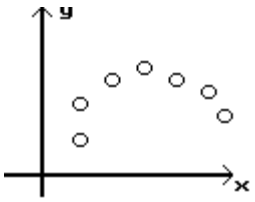


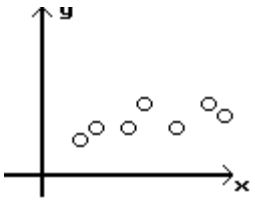
D)

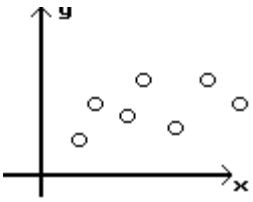


Determine which scatterplot shows the strongest linear correlation.

182) Which shows the strongest linear correlation? 182) _____

A) 

B) 

C) 

Find the value of the linear correlation coefficient r.

183)

x	46.2	21.9	25.6	47.9	39.0
y	10	4	5	2	5

183) _____

A) –0.209 B) 0 C) 0.209 D) 0.186

184) The paired data below consist of the test scores of 6 randomly selected students and the number of hours they studied for the test. 184) _____

Hours	5	10	4	6	10	9
Score	64	86	69	86	59	87

A) 0.224 B) 0.678 C) –0.224 D) –0.678

Suppose you will perform a test to determine whether there is sufficient evidence to support a claim of a linear correlation between two variables. Find the critical values of r given the number of pairs of data n and the significance level α.

185) n = 14, α = 0.01 185) _____

A) r = ±0.661 B) r = ±0.532 C) r = 0.661 D) r = 0.684

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Describe the error in the stated conclusion.

186) Given: There is a significant linear correlation between the number of homicides in a town and the number of movie theaters in a town. 186) _____

Conclusion: Building more movie theaters will cause the homicide rate to rise.

187) Given: Each school in a state reports the average SAT score of its students. There is a significant linear correlation between the average SAT score of a school and the average annual income in the district in which the school is located. 187) _____

Conclusion: There is a significant linear correlation between individual SAT scores and family income.

188) Given: The linear correlation coefficient between scores on a math test and scores on a test of athletic ability is negative and close to zero. 188) _____

Conclusion: People who score high on the math test tend to score lower on the test of athletic ability.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use the given data to find the best predicted value of the response variable.

189) Six pairs of data yield r = 0.444 and the regression equation $\hat{y} = 5x + 2$. Also, $\bar{y} = 18.3$. What is the best predicted value of y for x = 5? 189) _____

A) 27 B) 93.5 C) 4.22 D) 18.3

190) The regression equation relating attitude rating (x) and job performance rating (y) for the employees of a company is $\hat{y} = 11.7 + 1.02x$. Ten pairs of data were used to obtain the equation. The same data yield r = 0.863 and $\bar{y} = 80.1$. What is the best predicted job performance rating for a person whose attitude rating is 68? 190) _____

A) 80.1 B) 12.6 C) 81.1 D) 79.9

Use the given data to find the equation of the regression line. Round the final values to three significant digits, if necessary.

191)

x	2	4	5	6
y	7	11	13	20

191) _____

A) $\hat{y} = 0.15 + 3.0x$ B) $\hat{y} = 3.0x$ C) $\hat{y} = 0.15 + 2.8x$ D) $\hat{y} = 2.8x$

192) Ten students in a graduate program were randomly selected. Their grade point averages (GPAs) when they entered the program were between 3.5 and 4.0. The following data were obtained regarding their GPAs on entering the program versus their current GPAs. 192) _____

Entering GPA	Current GPA
3.5	3.6
3.8	3.7
3.6	3.9
3.6	3.6
3.5	3.9
3.9	3.8
4.0	3.7
3.9	3.9
3.5	3.8
3.7	4.0

A) $\hat{y} = 5.81 + 0.497x$ B) $\hat{y} = 2.51 + 0.329x$

C) $\hat{y} = 4.91 + 0.0212x$ D) $\hat{y} = 3.67 + 0.0313x$

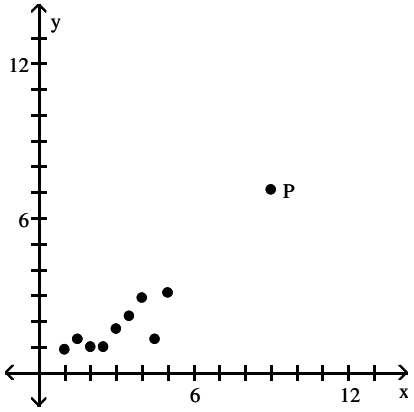
193) Managers rate employees according to job performance and attitude. The results for several randomly selected employees are given below. 193) _____

Performance	59	63	65	69	58	77	76	69	70	64
Attitude	72	67	78	82	75	87	92	83	87	78

A) $\hat{y} = 92.3 - 0.669x$ B) $\hat{y} = 2.81 + 1.35x$

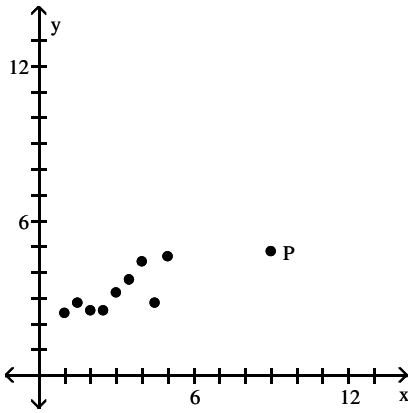
C) $\hat{y} = -47.3 + 2.02x$ D) $\hat{y} = 11.7 + 1.02x$

Is the data point, P, an outlier, an influential point, both, or neither?

194) 

194) _____

A) Both
B) Influential point
C) Neither
D) Outlier

195) 

195) _____

A) Neither
B) Both
C) Outlier
D) Influential point

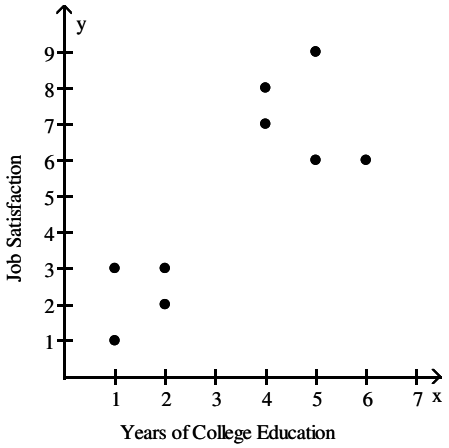
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

196) Nine adults were selected at random from among those working full time in the town of Workington. 196) _____

Each person was asked the number of years of college education they had completed and was also asked to rate their job satisfaction on a scale of 1 to 10.

The pairs of data values area plotted in the scatterplot below.



The four points in the lower left corner correspond to employees from company A and the five points in the upper right corner correspond to employees from company B.

a. Using the pairs of values for all 9 points, find the equation of the regression line.

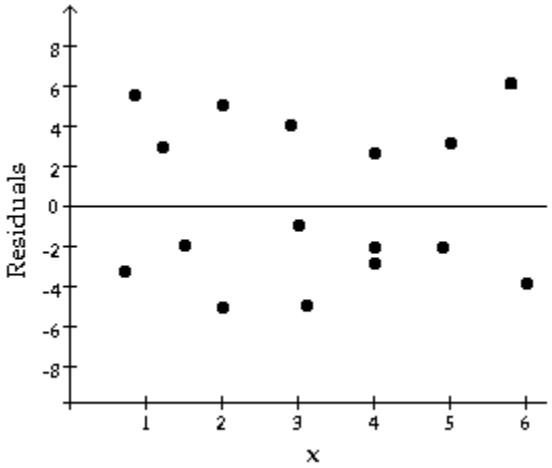
b. Using only the pairs of values for the four points in the lower left corner, find the equation of the regression line.

c. Using only the pairs of values for the five points in the upper right corner, find the equation of the regression line.

d. Compare the results from parts a, b, and c.

Provide an appropriate response.

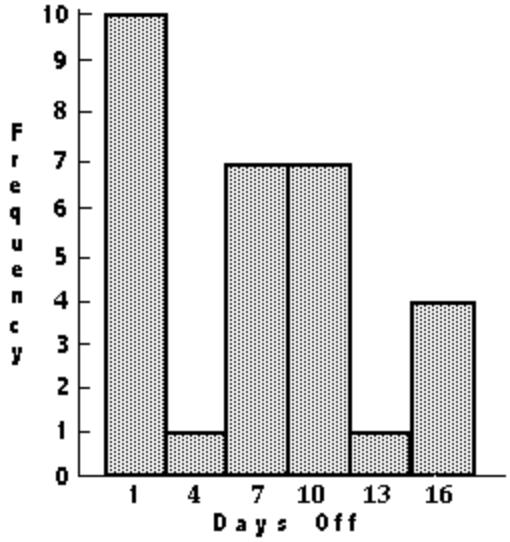
197) The following residual plot is obtained after a regression equation is determined for a set of data. Does the residual plot suggest that the regression equation is a bad model? Why or why not? 197) _____



1) B
2) There is no context to the data. The article should include the number of people taking the medication last year and this. More important than the number suffering serious side effects is the percentage of those taking the medication that suffer side effects. Although fewer people suffered side effects this year, it is possible (if fewer people are taking the medication this year) that the percentage suffering side effects has actually increased.
3) B
4) A
5) D
6) Sample: the 3 selected customers; population: all customers; not representative
7) The sample was too small.
8) A
9) A
10) If a person's back pain was reduced by 100%, it would be completely eliminated, so it is not possible for a person's back pain to be reduced by more than 100%.
11) B
12) B
13) C
14) B
15) B
16) D
17) A
18) C
19) C
20)

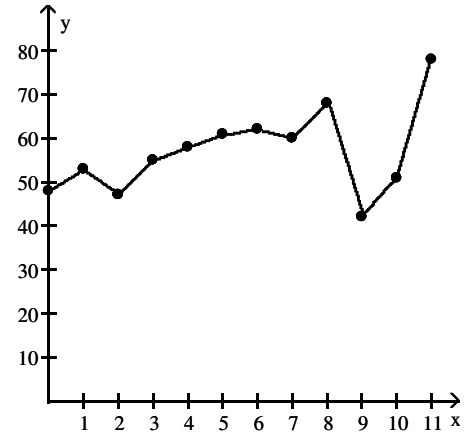
Score	Frequency
60–69	3
70–79	12
80–89	7
90–99	2

21) The distribution does not appear to be normal. It is not bell-shaped and it is not symmetric.

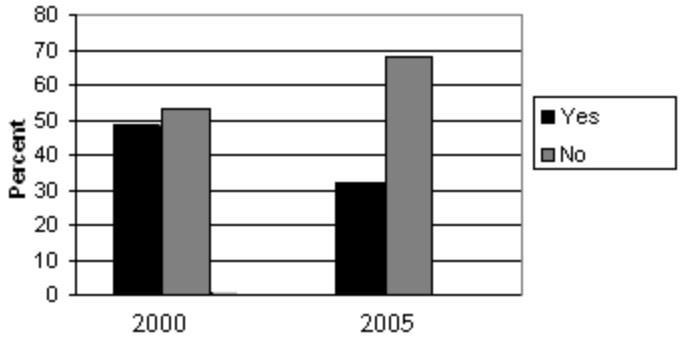


22) B
23) A
24) D

25) B
26) A
27) A
28) C
29) Trend: Answers will vary. Possible answer: Except for a drop in high closing value in 1994, there was a steady rise through 2000, after which there was a sharp drop in 2001 followed by increases through 2003.



30) Losses due to employee theft have decreased from 2000 to 2005.



31) The graph distorts the data because the the vertical scale starts at 60 rather than 0, giving the impression of a large difference in the number of accidents, when actually the number of accidents only varies from 90 to 120. To make the graph less misleading, change the vertical scale so that it begins at 0 and increases in increments of 20.
32) A
33) C
34) D
35) A
36) B
37) Central air: mean = $66.20; median = $65
Window unit: mean = $71.60; median = $84
Window units appear to be significantly more expensive.
38) A
39) D
40) B
41) A
42) D
43) C
44) B
45) B

46) B
47) D
48) D
49) B
50) D
51) C
52) B
53) B
54) D
55) A
56) D
57) C
58) B
59) D
60) C
61) B
62) D
63) D
64) A
65) B
66) B
67) B
68) A
69) D
70) D
71) A
72) A
73) A
74) Not a probability distribution. The sum of the P(x)'s is not 1, since $1.077 \neq 1.000$.
75) A
76) C
77) C
78) A
79) D
80) A
81) A
82)

x	P(x)
0	0.167
1	0.500
2	0.300
3	0.033

$\mu = 1.200$
$\sigma = 0.748$

83) A
84) A

85) a. 0.00879
b. WWCCC
WCWCC
WCCWC
WCCCW
CWWCC
CWCWC
CWCCW
CCWWC
CCWCW
CCCWW
Each of the 10 arrangements has probability 0.00879
c. 0.0879
86) B
87) C
88) C
89) C
90) C
91) C
92) B
93) C
94) D
95) C
96) A
97) C
98) C
99) C
100) B
101) C
102) D
103) C
104) D
105) A
106) C
107) D
108) D
109) A
110) A
111) D
112) C
113) C
114) Statistic, because it is calculated from a sample, not a population.
115) B
116) C
117) A
118) A
119) A
120) B
121) B
122) A

123) C
124) B
125) C
126) C
127) D
128) B
129) C
130) D
131) C
132) B
133) D
134) C
135) D
136) B
137) D
138) A
139) D
140) C
141) B
142) D
143) D
144) A
145) C
146) C
147) H_0: $p = 0.03$. H_1: $p > 0.03$. Test statistic: $z = 1.57$. P–value: $p = 0.0582$.
Critical value: $z = 2.33$. Fail to reject null hypothesis. There is not sufficient evidence to warrant rejection of the manager's claim that production is not really out of control.
148) H_0: $p = 0.34$. H_1: $p > 0.34$. Test statistic: $z = 2.27$. P–value: $p = 0.0116$.
Critical value: $z = 1.645$. Reject null hypothesis. There is sufficient evidence to support the researcher's claim that the proportion for fathers in Littleton is higher than 34%.
149) H_0: $p = 0.5$. H_1: $p > 0.5$. Test statistic: $z = 0.99$. P–value: $p = 0.1611$.
Critical value: $z = 2.33$. Fail to reject null hypothesis. There is not sufficient evidence to support the claim that more than half of all those using the drug experience relief.
150) B
151) D
152) H_0: $\mu = 200$; H_1: $\mu < 200$; Test statistic: $z = -0.98$. P–value: 0.1635. Fail to reject H_0. There is not sufficient evidence to support the claim that the mean is less than 200 pounds.
153) H_0: $\mu = 39.9$; H_1: $\mu \neq 39.9$. Test statistic: $z = 3.75$. P–value: 0.0002. Reject H_0. There is sufficient evidence to warrant rejection of the claim that the mean equals 39.9 cm.
154) H_0: $\mu = 72$ beats per minute
H_1: $\mu < 72$ beats per minute
Test statistic: $z = -1.94$
Critical–value: $z = -1.645$
Reject H_0; At the 5% significance level, there is sufficient evidence to support the claim that .these sample pulse rates come from a population with a mean less than 72 beats per minute.
155) B

156) $\alpha = 0.1$
Test statistic: $t = 1.57$
P–value: $p = 0.1318$
Critical values: $t = \pm 1.729$
Because the test statistic, $t < 1.729$, we fail to reject the null hypothesis. There is not sufficient evidence to warrant rejection of the claim that $\mu = 132$ lb.

157) H_0: $\mu = 160$. H_1: $\mu > 160$. Test statistic: $t = 9.583$. P–value < 0.005. Reject H_0. There is sufficient evidence to support the claim that the mean is greater than 160.

158) H_0: $\mu = 14$ oz. H_1: $\mu \neq 14$ oz. Test statistic: $t = 0.408$. Critical values: $t = \pm 3.499$. Fail to reject H_0. There is not sufficient evidence to warrant rejection of the claim that the mean weight is 14 ounces.

159) D

160) H_0: $p_1 = p_2$. H_1: $p_1 \neq p_2$.
Test statistic: $z = 1.93$. Critical values: $z = \pm 1.96$.
Fail to reject the null hypothesis. There is not sufficient evidence to warrant rejection of the claim that the two proportions are equal.

161) H_0: $p_1 = p_2$. H_1: $p_1 < p_2$.
Test statistic: $z = -1.80$. Critical value: $z = -2.05$.
Fail to reject the null hypothesis. There is not sufficient evidence to support the claim that the vaccine is effective in lowering the incidence of the disease.

162) C

163) A

164) A

165) A

166) H_0: $\mu_1 = \mu_2$.
H_1: $\mu_1 < \mu_2$.
Test statistic: $t = -8.426$.
Critical value: -2.364.
Reject the null hypothesis. There is sufficient evidence to support the claim that the treatment group is from a population with a smaller mean than the control group.

167) H_0: $\mu_1 = \mu_2$
H_1: $\mu_1 < \mu_2$
Test statistic: $t = -2.365$
$0.005 <$ P–value < 0.01
Reject H_0. At the 1% significance level, there is sufficient evidence to support the claim that the mean systolic blood pressure of vegetarians is lower than the mean systolic blood pressure of nonvegetarians.

168) D

169) D

170) H_0: $\mu_1 = \mu_2$
H_1: $\mu_1 < \mu_2$
Test statistic: $t = -3.451$
Critical value: $t = -1.699$
Reject H_0. At the 5% significance level, there is sufficient evidence to support the claim that the mean amount of time spent watching television by women is smaller than the mean amount of time spent watching television by men.

171) $H_0: \mu_1 = \mu_2$
$H_1: \mu_1 \neq \mu_2$
Test statistic: $t = -1.423$
Critical values: $t = \pm 1.729$
Do not reject H_0. At the 10% significance level, there is not sufficient evidence to warrant rejection of the claim that the mean GPA of students at college A is equal to the mean GPA of students at college B.
172) C
173) D
174) C
175) D
176) C
177) A
178) $H_0: \mu_d = 0$. $H_1: \mu_d \neq 0$. Test statistic: $t = -2.134$. Critical values: $t = 4.604, -4.604$.
Fail to reject H_0. There is not sufficient evidence to support the claim that the tutoring has an effect.
179) $H_0: \mu_d = 0$. $H_1: \mu_d < 0$
Test statistic $t = -0.880$. Critical value: $t = -3.143$.
Fail to reject H_0. There is not sufficient evidence to support the claim that the technique is effective in raising the gymnasts' scores.
180) B
181) D
182) B
183) C
184) A
185) A
186) Significant correlation does not imply causality. Both variables are affected by a third variable (a lurking variable), namely the population of the town.
187) Averages suppress individual variation and tend to inflate the correlation coefficient. The fact that there is significant linear correlation between average SAT scores and average incomes in the district does not necessarily imply that there is significant linear correlation between individual SAT scores and family incomes.
188) Because the linear correlation coefficient is close to zero and is probably not significant, no conclusion can be reached regarding the relationship between scores on the math test and scores on the test of athletic ability.
189) D
190) C
191) B
192) D
193) D
194) A
195) C
196) a. $\hat{y} = 0.833 + 1.25x$
b. $\hat{y} = 1.5 + 0.5x$
c. $\hat{y} = 10.29 - 0.643x$
d. The results are very different indicating that combinations of clusters can produce results that differ dramatically from results within each cluster alone.
197) No, the residual plot does not suggest that the regression equation is a bad model. The residual plot does not have ar obvious pattern that is not a straight line. This confirms that a scatterplot of the sample data is a straight line. The residual plot does not become thicker or thinner when viewed from left to right. This confirms that for different fixed values of x, the distributions of the corresponding y–values all have the same standard deviation.