Final Exam Review
Math 1530

Name_____

Section_____

Term_____

Select the most appropriate answer.
    1) The following statement refers to which aspect of a statistical study: "A meteorologist constructs a graph showing the predicted precipitation in Clarksville, TN for next week"?

    2) The following statement refers to which aspect of a statistical study: "Based on previous clients, a marriage counselor concludes that the majority of marriages that begin with cohabitation before marriage will result in divorce"?
        A) Design   B) Description   C) Inference

Determine whether the summary measure is better described as a parameter or a statistic.
    3) The average age of all Austin Peay students at Austin Peay.

Provide an appropriate response.
    4) 42% of registered voters in Tennessee voted in the June primary. Which type of statistics does this statement reflect: inferential statistics or descriptive statistics?

    5) Using an computer to mimic what would actually happen if you selected a sample and used statistics in real life is called

Classify the variable as either categorical or quantitative, and, if applicable, state whether the variable is discrete or continuous.
    6) Your statistics teacher has gathered information on each of the students in your class in order to illustrate the difference between discrete and continuous variables. For each student, she has recorded their height, number of credit hours completed and the time it took for them to complete their last exam. The variable "number of credit hours" is

Provide an appropriate response.

7) A sample of recent car buyers was asked to identify what they considered to be the most useful source of information about the cars they purchased. The results follow.

Source	Count
Consumer guide	172
Dealership	93
Internet	26
Word of mouth	40

Source: Automotive Retailing Today, The Gallup Organization.

a. Construct a pie chart for these data.

b. In creating a bar graph of these data, would it be more useful to list the sources of consumer information in the same order in which they appear in the table above or in the form of a Pareto chart?

8) The article "Tobacco and Alcohol Use in G–Rated Children's Animated Films" investigated exposure to tobacco and alcohol use in all G–rated animated films released between 1937 and 1997 by five major film studios. Data on the total tobacco exposure time (in seconds) for films with tobacco use produced by Walt Disney, Inc., follow.

33	36	8	27	18	21	9	17	31
5	34	39	2	16	3	36	9	

Source: Journal of the American Medical Association (1999): 1131–1136.

a. Construct a dot plot for these data.

b. Construct a stem–and–leaf plot.

c. Construct a histogram.

d. Identify the shape of the histogram.

e. Find the mean.

f. Find the median.

g. Find the mode.

h. Find the range.

i. Find the standard deviation.

j. Give the five number summary.

k. Showing caculations, determine and list any outliers, or state that no outliers exist.

l. Construct the boxplot.

9) SAT verbal scores are normally distributed with a mean of 433 and a standard deviation of 90. Use the Empirical Rule to determine what percent of the scores lie between 253 and 613.

10) Test scores for a history class had a mean of 80 with a standard deviation of 3.5. Test scores for a physics class had a mean of 81 with a standard deviation of 3.7. Suppose a student gets a 73 on the history test and a 71 on the physics test. Calculate the z–score for each test. On which test did the student perform better relative to classmates?

11) According to a national survey, the mean height for women between 18 and 22 was 65 inches. Noting that most women are between 54 and 75 inches, what is the most plausible value for the standard deviation of the scores?
   A) 10   B) –10   C) 21   D) 0   E) 3.5

Identify the abuse of statistics.

12) Which of the following is not a guideline to use for constructing effective graphs?
   A) Provide a heading for the graph.
   B) Strive for clarity and simplicity.
   C) Labels along the vertical axis should start with zero.
   D) Freely use figures like people to make the graph more attractive.
   E) Label both the x– and y–axes.

Provide an appropriate response.

13) For the following pairs of variables, which is more naturally the response variable and which is the explanatory variable?

   a. Hours of studying and final exam score

   b. Speed of plant growth and amount of fertilizer

   c. Basketball skills and height

14) The relationship between the number of games won by a minor league baseball team and the average attendance at their home games is analyzed. A regression to predict the average attendance from the number of games won has an $r = 0.73$. Interpret this statistic.
   A) Negative, fairly strong linear relationship. 53.29% of the variation in average attendance is explained by the number of games won.
   B) No association
   C) Positive, fairly strong linear relationship. 53.29% of the variation in average attendance is explained by the number of games won.
   D) Positive, weak linear relationship. 7.29% of the variation in average attendance is explained by the number of games won.
   E) Positive, fairly strong linear relationship. 73% of the variation in average attendance is explained by the number of games won.

15) A linear model for the relationship between study time and problems missed on the exam is found. The regression has an $R^2 = 87.1\%$. Describe the relationship
   A) Positive, strong linear relationship. As the study time increases the number of problems missed up.
   B) Positive, weak linear relationship. As the study time increases the number of problems missed goes down.
   C) Negative, weak linear relationship. As the study time decreases the number of problems missed goes down.
   D) Negative, strong linear relationship. As the study time increases the number of problems missed goes down.
   E) No association

Use your graphing calculator to find the following for the given data .

16) Below are the Olympic gold medal performances in the men's high jump from 1960 to 1984.

Year	High Jump (in.)
1960	85.25
1964	85.75
1968	88.25
1972	87.75
1976	88.50
1980	92.50
1984	92.25
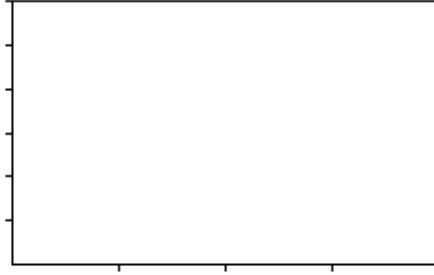
a. Draw the scatterplot above, being sure to label and mark both axes.

b. Find the regression equation, being sure to state it as an equation.

c. Describe the correlation between year and high jump as positive or negative and describe the strength of the correlation based on the graph.

d. Predict the gold medal high jump height in inches in 1988.

e. Is it wise to predict the gold medal high jump height in inches in 1988? Why or why not?

f. If the actual gold medal high jump height was 93.70 inches in 1998, what is the residual for our prediction in d?

Select the most appropriate answer.

17) A study shows that the salary of a graduate's first job is positively correlated to his or her grade in statistics. Which of the following identifies a potential confounding variable?

  A) Statistics grade
  B) No confounding variable
  C) Overall intelligence and determination
  D) Salary
  E) Interview attire

Provide an appropriate response.

18) A magazine publisher inserts a postage–paid survey into an issue of its magazine in order to collect information regarding reader satisfaction with the magazine. What type of sample is this? Is this a good or bad way to sample? Why?

19) We must select five random players from 53 players on a football team. Select the numbers of the first five players that belong to the sample using the random numbers given below.

  16348   76938   90169   51392   55887   71015   09209   79157

List all possible samples from the specified population.

20) As freshmen, you can take English (E), Math (M), an Appreciation course (A), Communications (C), History (H), or University 101 (U). List the 15 possible samples (without replacement) of size two from this population of six candidates.

Identify the bias.

21) A gym mails a survey to every member asking about the quality of its weightlifting faciilities. From which type of bias is this study most likely to suffer?

  A) Undercoverage
  B) Both nonresponse bias and undercoverage
  C) Sampling bias
  D) Nonresponse bias
  E) Both undercoverage and sampling bias

Identify the specified elements of the experiment.

22) In a clinical trial, 780 participants suffering from high blood pressure were randomly assigned to a treatment group. Over a one–month period, some participants received a low dosage of an experimental drug, some received a high dosage of the drug, and some received a placebo. In addition to the drug therapy, some participants underwent nightly paced breathing and meditation exercises while some did not. The diastolic blood pressure of each participant was measured at the beginning and at the end of the period and the change in blood pressure was recorded. Identify:

   a. the experimental unit,

   b. the explanatory variable(s),

   c. the reponse variable(s), and

   d. the treatments.

Select the most appropriate answer.

23) The process of assigning several experimental units to each treatment is called
   A) blinding
   B) randomization.
   C) repeated sampling.
   D) replication.
   E) cluster sampling.

Determine whether the experiment is blind, double blind, or neither.

24) A researcher wants to investigate whether different amounts of drug therapy can be used to increase the attention span of children who have been diagnosed with ADHD. A group of 45 children aged 6–12 who have been diagnosed with ADHD are randomly selected to participate in the study. The children are evaluated at the beginning of the study, and their attention span is measured. The children are then randomly assigned to one of three drug treatment groups: placebo, low, or high dosage. All three drug therapies looked the same, and participants were not told which drug they were taking. At the end of a six week period the students will be re–evaluated and their attention spans re-measured. The person evaluating the children is not aware of which drug treatment group the child was a member.
   A) Double blind   B) Neither
   C) Subjects are blinded   D) Investigators are blinded

Identify which type of sampling is used.

25) A market researcher selects 500 drivers under 30 years of age and 500 drivers who are 30 years of age and older.
   A) Simple random sample
   B) Matched pair sample
   C) Cluster random sample
   D) Stratified random sample
   E) Convenience sample

Identify the type of observational study.

26) A statistical analyst obtains data concerning ankle injuries by tracking hospital patients from over a 3 year period.
   A) Case–control
   B) Retrospective
   C) Prospective
   D) Census
   E) Cross–sectional

Provide an appropriate response.

27) An educational researcher used school records to determine that, in one school district, 84% of children living in two–parent homes graduated high school while 75% of children living in single–parent homes graduated high school. Identify the cases and the controls.
   A) cases = children in the district living in a two–parent home;
      controls = children in the district living in a single parent home
   B) cases = children in the district who graduated high school;
      controls = children in the district who did not graduate high school
   C) cases = children in the district who graduated high school and lived in a two–parent home;
      controls = children in the district who did not graduate high school and lived in a two parent home
   D) cases = children in the district living in a two–parent home who graduated high school;
      controls = children in the district living in a single parent household who graduated high school

Determine whether the situation proposed is a relative frequency definition or a subjective definition.

28) Potential investors for a new housing community would like an estimate for the probability that 80% of the lots will be sold by the end of the first six months of sales.
   A) Subjective definition   B) Relative frequency definition

Provide an appropriate response.

29) A sample of two light bulbs is selected in succession, without replacement, from among 5 good ones and 4 defective ones. What is the probability of obtaining exactly one defective bulb?
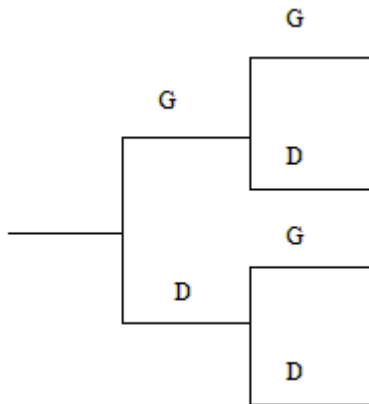
List the outcomes comprising the specified event.

30) When a quarter is tossed four times, 16 outcomes are possible.

HHHH   HHHT   HHTH   HHTT
HTHH   HTHT   HTTH   HTTT
THHH   THHT   THTH   THTT
TTHH   TTHT   TTTH   TTTT

Here, for example, HTTH represents the outcome that the first toss is heads, the next two tosses are tails, and the fourth toss is heads. The events A and B are defined as follows.

A = event exactly two tails are tossed
B = event the first toss is tails

List the outcomes that comprise the event (A and B).

Find the probability of A or B: P(A or B).

Provide an appropriate response.

31) Identify the sample space for the following probability experiment: recording the number of days it snowed in Cleveland in the month of January.

Determine whether the events are disjoint.

32) A card is selected randomly from a deck of 52. The events A, B, and C are defined as follows.

A = event the card selected is a heart
B = event the card selected is a club
C = event the card selected is an ace

Are the events A, B, and C disjoint?
  A) Yes   B) No

Draw a Venn diagram and shade the described events.

33) From a finite sample, events A and B are not disjoint; however, event C is disjoint from events A and B. Draw a venn diagram with the three events as described, and shade the collection **A or B or C**.

Suppose P(C) =0 .10, P(M and C) = 0.05, and P(M or C) = 0.5. Find the indicated probability.

34) P(M and C^c)

Find the indicated probability.

35) Determine the probability that the sum of the dice is 4 or 12.

A) $\dfrac{5}{36}$ B) $\dfrac{1}{12}$ C) $\dfrac{7}{36}$ D) $\dfrac{1}{6}$ E) $\dfrac{1}{9}$

36) A group of three must to be formed to fight the werewolves. The three will be selected at random from a list of five possible members: Alice, Bella, Carlisle, a Denali, and Edward (A, B, C, D, E). A simple random sample is taken, without replacement, from the group of five. Using the letters A, B, C, D, E to represent the five, list the possible samples of size three and use your list to determine the probability that both Bella and Edward are included in the sample.

(*Hint*: There are 10 possible samples.)

A) $\dfrac{3}{10}$ B) $\dfrac{3}{5}$ C) $\dfrac{7}{10}$ D) $\dfrac{2}{5}$ E) $\dfrac{1}{5}$

Provide an appropriate response.

37) According to the Center for Disease Control, 12% of US citizens got infected with a flu virus this past year. If we randomly select three people, what is the probability that none of them had the flu this past year?
   A) 0.002
   B) none of these
   C) 0.88
   D) 0.998
   E) 0.68

Obtain the probability distribution of the random variable.

38) When a coin is tossed three times, eight equally likely outcomes are possible as shown below:

HHH HHT HTH HTT
THH THT TTH TTT

Let X denote the total number of tails obtained in the four tosses. Find the probability distribution of the random variable X. Leave your probabilities in fraction form.

Determine the possible values of the random variable.

39) Suppose that two balanced dice, a red die and a green die, are rolled. Let Y denote the value of G minus R where G represents the number on the green die and R represents the number on the red die. What are the possible values of the random variable Y?

Find the mean of the given probability distribution.

40) The random variable X is the number of siblings of a student selected at random from a particular secondary school. Its probability distribution is given in the table. Find the expected value or mean of this probability distribution.

| x	0	1	2	3	4	5
$P(X = x)$	$\dfrac{7}{24}$	$\dfrac{13}{48}$	$\dfrac{3}{16}$	$\dfrac{7}{48}$	$\dfrac{1}{16}$	$\dfrac{1}{24}$

Use a table of areas or a calculator function to find the specified area under the standard normal curve.

41) The area that lies to the left of 1.13
  A) 0.8708   B) 0.8907   C) 0.1292   D) 0.8485   E) 0.4354

42) The area that lies between –1.10 and –0.36
  A) –0.2237   B) 0.7763   C) 0.2239   D) 0.4951   E) 0.2238

43) The area that lies to the right of –1.82
  A) 0.4656   B) 0.0344   C) 0.4828   D) –0.0344   E) 0.9656

44) The shaded area shown
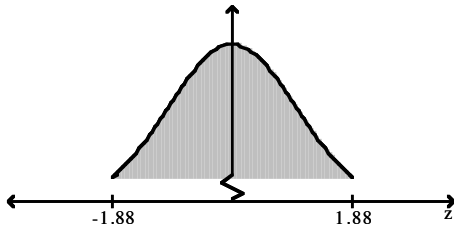
          A) 0.4699   B) 0.9398   C) 0.0602   D) 0.9412   E) 0.9699

Use a table of areas or a calculator function for the standard normal curve to find the required z–score.

   45) Find the z-score having area 0.86 to its right under the standard normal curve.

        A) –0.5557   B) 0.8051   C) 0.5557   D) 1.08   E) –1.08

Provide an appropriate response.

   46) Serum cholesterol is an important risk factor for coronary disease. The level of serum cholesterol is approximately normally distributed with a mean of 235 mg/dL and a standard deviation of 50 mg/dL. If the clinically desirable range for serum cholesterol is < 200 mg/dL, what is the probability that a randomly selected person will have a clinically desirable level of serum cholesterol?

Find the indicated probability for the normally distributed variable.

   47) The diameters of bolts produced by a certain machine are normally distributed with a mean of 0.30 inches and a standard deviation of 0.01 inches. What percentage of bolts will have a diameter greater than 0.32 inches?

        A) 2.28%   B) 37.45%   C) 97.72%   D) 4.56%   E) 47.72%

   48) In 2006, the percent of the voting–age population that was registered to vote for the 50 states and the District of Columbia had a mean of 65% with a standard deviation of 7.1 (*Statistical Abstract of the United States*). Assuming that the distribution is normal, what percentage of states had between 50 and 70 percent of it's voting–age population who were registered to vote?

        A) 0.95   B) 0.74   C) 0.20   D) 0.65   E) 0.68

Find the specified probability distribution of the binomial random variable.

49) In one city, 21% of the population is under 25 years of age. Three people are selected at random from the city. Find the probability distribution of X, the number among the three that are under 25 years of age.

A)

x	P(X = x)
0	0.4930
1	0.3932
2	0.0925
3	0.0213

B)

x	P(X = x)
0	0.4930
1	0.1311
2	0.0348
3	0.0093

C)

x	P(X = x)
1	0.21
2	0.0441
3	0.0093

D)

x	P(X = x)
1	0.21
2	0.0441
3	0.0213

E)

x	P(X = x)
0	0.4930
1	0.3932
2	0.1045
3	0.0093

Determine whether a probability model based on Bernoulli trials can be used to investigate the situation. If not, explain.

50) Based on a random sample of all of its hourly paid employees, a large fast–food chain estimates that 68% of its hourly paid employees are satisfied with their managers. Should the binomial distribution be used to model the number of employees at a given restaurant of this chain who are satisfied with their manager?
   A) Yes
   B) No. The sample size is more than 10% of the population size.
   C) No. The probability that a randomly selected worker is satisfied with their manager changes from worker to worker.
   D) No. Whether or not a worker is satisfied with their manager is not independent for employees working at the same restaurant location.
   E) No. There are more than two possible outcomes.

Select the most appropriate answer.

51) Which of the following is not true about the binomial distribution?
   A) The probability of success is constant from trial to trial.
   B) The trials are independent.
   C) The probability of success plus the probability of failure is one.
   D) The random variable X is continuous.
   E) None of these.

Find the mean of the binomial random variable.

52) According to a college survey, 22% of all students work full time. Find the mean for the random variable X, the number of students who work full time in samples of size 16.

    A) 3.52   B) 0.22   C) 4.00   D) 4.26   E) 2.75

Find the indicated probability.

53) A tennis player makes a successful first serve 59% of the time. If she serves 7 times, what is the probability that she gets exactly 3 first serves in? Assume that each serve is independent of the others.

    A) 0.4062   B) 0.2031   C) 0.2054   D) 0.7969   E) 0.0058

Is the observed sample proportion unusual?

54) Assume that 20% of students at a university wear contact lenses. We randomly pick 200 students. Would it be unusual to obtain a sample proportion of 28%? Answer by calculating the appropriate z–score.

    A) No, z = 2.83

    B) Yes, z = 2.83

    C) No, z = 25

    D) No, z = -2.83

    E) Yes, z = 25

Find the mean/standard error of the sampling distribution of the proportion.

55) Based on past experience, a bank believes that 8% of the people who receive loans will not make payments on time. The bank has recently approved 600 loans. Describe the sampling distribution model of the proportion of clients in this group who may not make timely payments.

    A) mean = 92%; standard error = 1.1%

    B) mean = 8%; standard error = 0.3%

    C) mean = 92%; standard error = 0.3%

    D) There is not enough information to describe the distribution.

    E) mean = 8%; standard error = 1.1%

Provide an appropriate response.

56) The body temperatures of adults have a mean of 98.6°F and a standard deviation of 0.50° F. Describe the center and spread of the sampling distribution of the sample mean for a random sample of 50 adults.

    A) center = 98.6, spread = 0.14

    B) center = 98.6, spread = 0.07

    C) center = 98.6, spread = 0.008

    D) center = 0.60, spread = 0.07

    E) center = 98.6, spread = 0.08

57) Assume that the heights of adult Caucasian women have a mean of 63.6 inches and a standard deviation of 2.5 inches. If 75 women are randomly selected, find the probability that they have a mean height between 63 and 65 inches.
   A) 0.3071
   B) not enough information to determine
   C) 0.9811
   D) 0.2119
   E) 0.0188

58) If the proportion of American adults who believe that America is ready for a woman president is 0.74, what are the mean and standard deviation for the number of people who believe that America is ready for a woman president for a sample of size 1000?

59) What are the two properties of a good point estimator?

Find the standard error
   60) A poll of 163 voters resulted in 110 favorable responses. Find the standard error for the sample proportion.

   A) 0.0367   B) 0.0447   C) 0.0179   D) 0.0649   E) 0.0139

Provide an appropriate response.
   61) In 2006, the General Social Survey asked 500 respondents how many hours they spent per week on the internet. The sample mean was 6.74 and the standard error of this estimate is 0.20. What is the margin of error for a 95% confidence interval for the population mean number of hours spent weekly on the internet?
   A) 0.52   B) 0.39   C) 0.40   D) 0.20   E) 1.96

   62) According to the Consumer Expenditure Survey of 2006, the mean income before taxes of consumer units (i.e., households) in the U.S. was $60,533 with a margin of error equal to 1406.32 (for a 95% confidence level). Calculate a 95% confidence level for the population mean income before taxes for all U.S. consumer units.
   A) (57,776.61, 63,289.39)
   B) (59,097.98, 61,968.02)
   C) (59,126.68, 61,939.32)
   D) (60,166.92, 60,899.08)
   E) (58,681.82, 62,384.18)

Find the margin of error

63) A survey found that 89% of a random sample of 1024 American adults approved of cloning endangered animals. Find the margin of error for this survey if we want 90% confidence in our estimate of the percentage of American adults who approve of cloning endangered animals.

A) 1.92%   B) 16.5%   C) 1.61%   D) 4.85%   E) 1.10%

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

64) Of 346 items tested, 12 are found to be defective. Construct a 98% confidence interval to estimate the proportion of all such items that are defective.
   A) (0.013, 0.680)
   B) (0.015, 0.054)
   C) (0.012, 0.058)
   D) (0.093, 0.600)
   E) (0.014, 0.055)

Select the most appropriate answer.

65) When a higher confidence level is used to estimate a proportion and all other factors involved are held constant
   A) there is not enough information to determine the effect on the confidence interval.
   B) the confidence interval will be narrower.
   C) the confidence interval will be wider.
   D) the confidence interval will not be affected.
   E) the confidence interval will be less likely to contain the parameter being estimated.

Provide an appropriate response.

66) A poll in 2000 of 500 Canadians by the *National Post* asked whether marijuana should be legalized for medical purposes. 72% said definitely yes, 20% said probably, 2% said probably not, 5% said definitely not, and 2% had no opinion.
   a. Assuming that this was a random sample, construct a 95% confidence interval for the population proportion who would answer definitely yes or probably. Can you conclude that a majority of all Canadians would answer this way? Explain.
   b. Check that the sample size was large enough to construct the interval in (a).

67) In a survey of 1,000 television viewers, 40% said they watch network news programs. For a 99% confidence level, the margin of error for this estimate is 3.99%. If we only want to be 90% confident, how will the margin of error change?

A) Since less confidence allows a wider interval, the margin of error will be larger.
B) Since less confidence allows a wider interval, the margin of error will be smaller.
C) Since less confidence allows a narrower interval, the margin of error will be smaller.
D) Since less confidence allows a narrower interval, the margin of error will be larger.
E) the margin of error will remain the same.

Using the t–tables, software, or a calculator, report the t–score for the given confidence interval and degrees of freedom.

68) 90% confidence interval with df = 4.

A) 2.120   B) 1.960   C) 2.132   D) 1.753   E) 2.145

Provide an appropriate response.

69) Suppose you have obtained a 95% confidence interval for μ. Which of the following statements is/are true regarding the relationship between precision and confidence level? Assume that the sample size is fixed.
  I.   Increasing the confidence level to 99% will result in a narrower interval.
  II.   Decreasing the confidence level to 90% will result in greater precision.
  III. Decreasing the precision will result in a higher confidence level.
  IV. Increasing the precision will result in a higher confidence level.
  A) both II and III
  B) both II and IV
  C) both I and IV
  D) both I and II
  E) both I and III

Find the requested value

70) A researcher wishes to estimate the mean resting heart rate for long–distance runners. A random sample of 12 long–distance runners yields the following heart rates, in beats per minute.

    71 62 65 60 69 72
    78 79 73 65 60 63

Use the data to obtain a point estimate of the mean resting heart rate for all long distance runners.

A) 69.8 beats per minute
B) 70.1 beats per minute
C) 68.1 beats per minute
D) 66.4 beats per minute
E) 64.8 beats per minute

Determine the margin of error in estimating the population parameter.

71) Based on a sample of size 49, a 95% confidence interval for the mean score of all students on an aptitude test is from 64.3 to 69.7.

A) 0.76   B) 5.4   C) 2.7   D) 0.05   E) 1.35

Construct the requested confidence interval from the supplied information.

72) Thirty randomly selected students took the statistics final. If the sample mean was 82 and the standard
deviation was 12.2, construct a 99% confidence interval for the mean score of all students.
  A) (76.52, 87.48)
  B) (75.88, 88.19)
  C) (78.22, 85.78)
  D) (75.86, 85.78)
  E) (75.86, 88.14)

73) A college math professor has office hours from 9:00 am to 10:30 am daily. A random sample of waiting times
to see the professor (in minutes) is 10, 12, 20, 15, 17, 10, 30, 28, 35, 28, 19, 27, 25, 22, 33, 37, 14, 21, 20, 23.
Assuming $\sigma = 7.84$, find the 95% confidence interval for the population mean.
  A) 19.5 to 35.1 minutes
  B) –3.5 to 3.5 minutes
  C) 19.5 to 25.8 minutes
  D) 18.9 to 25.7 minutes
  E) 18.6 to 26.0 minutes

Interpret the confidence interval.

74) Data collected by child development scientists produced the following 90% confidence interval for the
average age (in months) at which children say their first word: $10.4 < \mu < 13.8$.
  A) 90% of the children in this sample said their first word when they were between 10.4 and 13.8 months
     old.
  B) Based on this sample, we can say, with 90% confidence, that the mean age at which children say their
     first word is between 10.4 and 13.8 months.
  C) We are 90% confident that the average age at which children in this sample said their first word was
     between 10.4 and 13.8 months.
  D) We are 90% confident that a child will say his first word when he is older than 10.4 months.
  E) We are 90% confident that a child will say his first word when he is between 10.4 and 13.8 months old.

Provide an appropriate response.

75) A pollster wishes to estimate the true proportion of U.S. voters who oppose capital punishment. How many
voters should be surveyed in order to be 95% confident that the true proportion is estimated to within 2%?

  A) 2401
  B) 3385
  C) not enough information is given
  D) 1000
  E) 4145

Find the sample size

76) A population is normal with a variance, σ^2, of 36. Suppose you wish to estimate the population mean μ. Find the sample size needed to assure with 98% confidence that the sample mean will not differ from the population mean by more than 4 units.

    A) 311   B) 12   C) 21   D) 81   E) 9

Determine the null and alternative hypotheses.

77) A manufacturer claims that the mean amount of cola in its 16 ounce bottles is 16.1 ounces. A consumer advocacy group wants to perform a hypothesis test to determine whether the mean amount is actually less than this.

A) H_0: $\mu = 16.1$ ounces
   H_a: $\mu < 16.1$ ounces
B) H_0: $\mu < 16.1$ ounces
   H_a: $\mu = 16.1$ ounces
C) H_0: $\mu = 16.1$ ounces
   H_a: $\mu \le 16.1$ ounces
D) H_0: $\mu < 16.1$ ounces
   H_a: $\mu > 16.1$ ounces
E) H_0: $\mu = 16.1$ ounces
   H_a: $\mu > 16.1$ ounces

For the given sample data and null hypothesis, compute the value of the test statistic, z

78) A radio show producer believes that a new proposed format would be preferred by only 20% of their current listeners. A survey of 100 current listeners showed that 17% favored the new format. Does the producer know his business?

H_0: $p = 0.20$

    A) 0.23   B) 0.17   C) –0.80   D) –0.75   E) 0.08

Find the P–value and test statistic for the indicated hypothesis test.

79) A medical school claims that more than 28% of its students plan to go into general practice. It is found that among a random sample of 130 of the school's students, 39% of them plan to go into general practice. Find the P–Value for testing the school's claim.

    A) 0.3078   B) 0.0280   C) 0.3461   D) 0.0026   E) 0.1635

State conclusion to significance test in terms of the null hypothesis

80) In a Quinnipiac University Poll of 1556 registered voters nationwide taken in June of 2007, 43% of those polled blamed oil companies the most for the recent increase in gasoline prices. Test the claim that the percentage of registered voters nationwide who blame oil companies the most for the recent increase in gasoline prices is at least 45% using α=0.01.
Test statistic: z=–1.59. P–Value=0.94

    A) Since the P–value > α, we can conclude that the percentage of registered voters nationwide who blame oil companies the most for the recent increase in gasoline prices is at least 45%.

    B) Since the P–value > α, we conclude that the percentage of registered voters nationwide who blame oil companies the most for the recent increase in gasoline prices is 43%.

    C) Since the P–value > α, we conclude that the percentage of registered voters nationwide who blame oil companies the most for the recent increase in gasoline prices is 45%.

    D) Since the P–value is larger than 45%, we cannot conclude that the percentage of registered voters nationwide who blame oil companies the most for the recent increase in gasoline prices is at least 45%.

    E) Since the P–value > α, we cannot conclude that the percentage of registered voters nationwide who blame oil companies the most for the recent increase in gasoline prices is at least 45%.

Assume that a simple random sample has been selected from a normally distributed population. Find the test statistic t.

81) Test the claim that for the adult population of a certain town, the mean annual salary is given by μ = $30,000.
Sample data are summarized as n = 17, $\overline{x}$ = $22,298, and s = $14,200. Use a significance level of α = 0.05.
Find the test statistic t.

    A) –2.24   B) 2.24   C) –9.22   D) 1.57   E) –1.57

Assume that a simple random sample has been selected from a normally distributed population. State the final conclusion.

82) Test the claim that the mean lifetime of a particular car engine is greater than 220,000 miles. Sample data are summarized as n = 23, $\overline{x}$ = 226,450 miles, and s = 11,500 miles. Use a significance level of α = 0.01.
H_0: μ = 220,000 H_a: μ > 220,000
State your conclusion about H_0.

    A) t = 2.69, reject H_0

    B) t = –2.69, reject H_0

    C) t = 12.9, do not reject H_0

    D) t = 2.69, do not reject H_0

    E) z = –2.69, reject H_0

Provide an appropriate response.

83) Recent findings have suggested that neonatal sex differences exist in behavioral and physiological reactions to stress. One study (M. Davis and E. Emory, *Child Development*, Vol. 66, 1995, pp. 14–27) evaluated changes in the heart rate for a sample of infants placed in a stressful situation. For the 15 female infants, the following is a printout for the data on the change in heart rate.

Variable	Number of Cases	Mean	SD	SE of Mean	t–value	df	2–Tail Sig
CHANGE	15	10.70	17.70	4.570	2.341	14	0.0346

a. State the hypotheses.
b. State the test statistic.
c. State the P–value.
d. Interpret the P–value in context.

Classify the significance test as two–tailed, left–tailed, or right–tailed.

84) At one school, the average amount of time ninth–graders spend watching television each week is 21.6 hours. The principal introduces a campaign to encourage the students to watch less television. One year later, the principal wants to perform a significance test to determine whether the average amount of time spent watching television per week has decreased from the previous mean of 21.6 hours.

A) Left–tailed
B) Middle–tailed
C) Two–tailed
D) Right–tailed
E) None of these