Final practice 2

November 25, 2015 2:30 PM

PracticeExam2

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KINGS UNIVERSITY COLLEGE
THE UNIVERSITY OF WESTERN ONTARIO
DEPARTMENT OF STATISTICAL AND ACTUARIAL SCIENCES
STATISTICS 1024 FINAL EXAM

PRACTICE EXAM 2

INSTRUCTIONS:

- This is a three-hour closed book exam.
- Use only an HB pencil for the Scantron sheet.
- Fill in NAME, INSTRUCTOR, SIGNATURE and COURSE on the Scantron sheet.
- **Fill in and code your STUDENT NUMBER, SECTION and EXAM CODE on the Scantron sheet.** Your EXAM CODE is 155.
- Leave the ANSWER SHEET NUMBER blank on the Scantron sheet.
- There are 50 multiple choice questions. A blank page for rough work is at the end of the paper.
- **Code** your answers on the Scantron sheet.
- Only non-programmable calculators are permitted.
- **NO EXTRA TIME WILL BE GIVEN TO CODE YOUR ANSWERS!!**
- **Please HAND IN EVERYTHING at the end of the exam.**

GOOD LUCK!

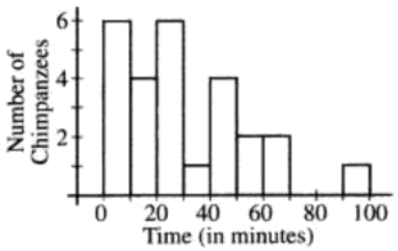
1) A study calculated the number of infants who died before reaching age 1 out of 100,000 newborn children for 35 different nations. The objective was to determine which nations had higher numbers of deaths for the first year of life and which nations had lower numbers.

CH1

What type of graph is the best way to achieve this objective?

(A) Bar graph (B) Scatterplot (C) Histogram (D) Stemplot

2) The histogram below displays the times, in minutes, needed for each chimpanzee in a sample of 26 to complete a simple navigational task.



→ skewed to the right. $\bar{x}$ > median

How do the mean and median times compare?

CH2

(A) The mean is less than the median.

(B) The mean is approximately the same as the median.

(C) The mean is greater than the median.

(D) Not enough information to determine.

3) The stemplot below summarizes the final year averages of a small graduating honors class in the Faculty of Science.

CH2

6	88
7	24567
8	2346
9	014
10	

Which of the following statements is correct?

(A) The range is 12 $94-68=26$

(B) The median is 79.5 $n=14$, Location of median $=\frac{14+1}{2}=7.5$th

$\Rightarrow$ median $=\frac{7\text{th}+8\text{th}}{2}=\frac{77+82}{2}=79.5$

(C) Q_3 equals 86.5

(D) Q_1 equals 73.5

4) A special diet was given to a species of birds and the gain in weight (in grams) over a 5-week period was measured. The following are the summary statistics for a random sample of 30 birds: 5-number summary: 55, 90, 105, 120, 155

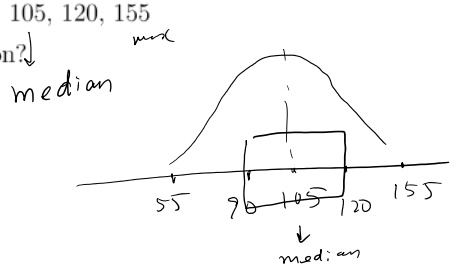
What is the most likely shape of the distribution?

(A) Approximately symmetric.

(B) Skewed to the left.

(C) Skewed to the right.

(D) Not enough information to determine.



5) According to a recent study, the weight of male brains is normally distributed with a mean of 1400 grams and a standard deviation of 110 grams.

40% of males have a brain weight less than:

(A) 1397 grams

(B) 1472 grams

(C) 1428 grams

(D) 1373 grams

$X \sim N(1400, 110)$. Find x_0 such that $P(X < x_0) = 0.40$

$P\left(Z < \frac{x_0 - 1400}{110}\right) = 0.4 \Rightarrow \frac{x_0 - 1400}{110} = -0.25$ (Table A)

$\Rightarrow x_0 = 1400 - 0.25 \times 110 = 1372.5$

6) One of the side effects of flooding a lake in northern boreal forest areas (e.g. for a hydro-electric project) is that mercury is leached from the soil, enters the food chain, and eventually contaminates the fish. The concentration in fish will vary among individual fish because of differences in eating patterns, movements around the lake, etc. Suppose that the concentrations of mercury in individual fish follow an approximate normal distribution with a mean of 0.25 ppm and a standard deviation of 0.079 ppm. Fish are safe to eat if the mercury level is below 0.30 ppm.

What percentage of fish are **not** safe to eat?

(A) 63% (B) 26% (C) 48% (D) 74% (E) 37%

$X \sim N(0.25, 0.079)$

$P(X > 0.3) = P\left(Z > \frac{0.3 - 0.25}{0.079}\right) = P(Z > 0.63)$

$= 1 - 0.7357 = 0.2643$

7) Scores (out of 100) for a math course are known to follow a normal distribution with mean 76 and standard deviation 8, and this distribution remains the same from term to term. There are 600 students taking this particular math course this term.

How many of these students are expected to have scores between 70 and 82?

(A) 464 (B) 328 (C) 450 (D) 272 (E) 136

$X \sim N(76, 8^2)$

$P(70 < X < 82) = P\left(\frac{70 - 76}{8} < Z < \frac{82 - 76}{8}\right)$

$= P(-0.75 < Z < 0.75) = 1 - 2 \times P(Z < -0.75)$

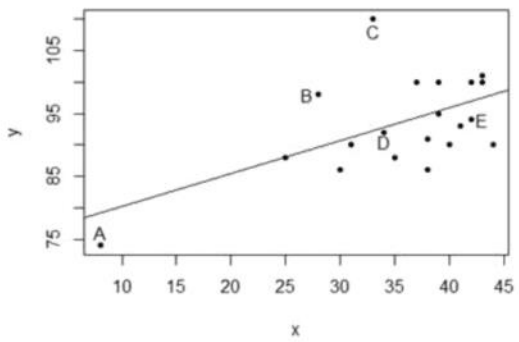
$= 1 - 2 \times 0.2266 = 0.5468$

$0.5468 \times 600 = 328.08 \approx 328$ students

600 students in total.

8) The scatterplot of y versus x is shown below and the least squares regression line is superimposed on the plot.

CH 5



Which of the following points has the second largest residual?

(A) Point A (B) Point B (C) Point C (D) Point D (E) Point E

9) In a study of 2013 model cars, a researcher computed the least-squares regression line of price (in dollars) on horsepower. The horsepower in the cars studied ranged from 150 HP to 400 HP. He obtained the following equation for this line.

CH5

$$\text{Price} = -6677 + 175 \times \text{horsepower}$$

If this least squares regression line predicted the price of a 2013 model car to be \$28,323, its horsepower would be

$28323 = -6677 + 175 \times \text{horsepower}$

(A) 275 (B) 124 (C) 175 (D) 200

$\Rightarrow$ horsepower $= 200$

10) The least-squares regression line is

CH5

(A) a line such that half the data points fall above and half fall below the line.

(B) a line that passes through the point $(\bar{x}, \bar{y})$.

(C) a line that passes through most of the data points.

(D) none of the above.

11) Two variables in a study are said to be confounded if

(A) their effects on a response variable cannot be separated.

(B) they are disjoint.

(C) their values come from an observational study.

(D) they are independent.

12) From a data set the least squares regression line is given by $\hat{y} = 1.2 - 0.7x$. Further, the sample variances are $s_y^2 = 6$ and $s_x^2 = 5$. What percentage of the variation in the values of y is explained by the least squares regression of y on x?

(A) 0.340 (B) 0.639 (C) 0.588 (D) 0.767 (E) 0.408

13) The following table gives the frequencies of the data on age (in years) and sex from the residents of a retirement home.

	Age (years)		
	$60-69$	$70-79$	Over 79
Male	15	1	5
Female	5	10	? x

The proportion of female residents who are 79 or younger is 0.79. How many female residents are over 79?

(A) 15 (B) 5 (C) 9 (D) 4 (E) Not enough information to determine.

14) In 2006, the General Social Survey asked "would you like to see more or less government spending on natural disasters?" Of the 1496 respondents, 723 responded "more" or "much more". The proportion of respondents who responded "more" or "much more" is an example of a

(A) parameter.

(B) variable.

(C) sample.

(D) statistic.

(E) population.

15) In an experiment with 4 treatments and 100 male and 100 female subjects, which of the following would be a randomized block design?

CH9

(A) Use a table of random digits to randomly assign 50 men to 2 of the 4 treatments and 50 women to the other 2 treatments

(B) Use a table of random digits to randomly assign 50 subjects to each of the 4 treatments.

(C) Use a table of random digits to randomly assign 25 men and 25 women to each of the 4 treatments.

(D) Use a table of random digits to randomly assign each subject to one of the 4 treatments.

16) A construction company has a bid on two large construction projects. The president believes that the chances of winning the first contract is 55% and the chances of winning the second contract is 30% and that winning either contract is independent of winning the other. What are the chances the company will not win either contract?

CH 12, 13

(A) 68.5% (B) 15.0% (C) 31.5% (D) 83.5% (E) 16.5%

$(1-0.30)(1-0.45) = 0.315$

Use the following information for the next TWO questions (Q17 and Q18):
A consumer organization evaluates new automobiles by reporting the number of major defects each car has. Let X = number of major defects on a randomly selected car of a certain type. The probability distribution of X is given below:

CH12

x	0	1	2	3	4	5	6	7	8	9	10
P(X = x)	0.075	0.096	0.122	0.152	0.223	0.138	0.072	0.065	0.037	0.016	0.004

17) You randomly select one car. What is the probability that it has 1 or more, but less than 6 defects?

$P(1,2,3,4,5) = 0.731$

(A) 0.803 (B) 0.635 (C) 0.707 (D) 0.731

18) Someone has randomly selected one car. If A is the event the car has at least 2 defects and B is the event the car has no more than 5 defects, what is the conditional probability of B, given A?

(A) 0.635 (B) 0.497 (C) 0.972 (D) 0.766

$A = \{x \geq 2\}$, $B = \{x \leq 5\}$

$P(B|A) = \frac{P(A \text{ and } B)}{P(A)} = \frac{P(2 \leq x \leq 5)}{P(x \geq 2)} = \frac{0.635}{1 - 0.075 - 0.098} = 0.788$

19) The following table summarizes the proportions of all Canadians who have been injured in the past year, by gender and circumstance of injury:

CH 6.

	Work	Home	Other	Totals
Males	0.1303	0.1596	0.2899	0.5798
Females	0.0212	0.1889	0.2101	0.4202
Totals	0.1515	0.3485	0.5000	1.0000

You randomly select a Canadian who was injured in the past year. What is the probability that the person selected was injured at home, given that the person is a female?

(A) 0.4495 (B) 0.1464 (C) 0.1889 (D) 0.5420 (E) 0.3485

0.1889 / 0.4202 = 0.4495

20) For two disjoint events A and B, you are given that P(A) = 0.4 and P(B) = 0.50. What is the value of P(A or B)?

CH 12

P(A or B) = P(A) + P(B) = 0.9

(A) 0.9 (B) 0.0 (C) 1.0 (D) 0.7

21) For two events A and B, you are given that P(A) = 0.64, P(B) = 0.40, P(A|B) = 0.6 and P(A or B) = 0.8. What is the value of P(B|A)?

CH 13

$P(A|B) = \frac{P(A \text{ and } B)}{P(B)} = 0.6$

(A) 0.600 (B) 0.400 (C) 0.240 (D) 0.375

$P(B|A) = \frac{P(A \text{ and } B)}{P(A)} = \frac{0.24}{0.64} = 0.375$

$\Rightarrow P(A \text{ and } B) = 0.6 \times 0.4 = 0.24$

22) An unfair coin is flipped 3 times. The probability of a head on any flip is 0.6. What is the probability that there are at most 2 heads?

CH 13

(A) 0.432 (B) 0.360 (C) 0.352 (D) 0.784 (E) 0.600

$1 - P(HHH) = 1 - (0.6)^3 = 0.784$

23) There are three sections of STAT 1024 being offered this term. An opinion survey is being conducted on students taking the course this term.

CH 8

Which of the following sampling methods will ensure representation from students in each of the three sections in the sample?

(A) Voluntary response sample

(B) Convenience sample

(C) Stratified random sample

(D) Simple random sample

24) The sample mean is an unbiased estimator for the population mean. This means:

CH15

(A) The sampling distribution has the same mean as the population distribution.

(B) The sample mean is equal to the population mean.

(C) The sampling distribution has a larger standard deviation than the population distribution.

(D) The sample mean is always very close to the population mean.

25) The law of large numbers says that:

CH15

(A) the sample mean gets closer and closer to the population mean as the number of samples taken gets larger and larger.

(B) the sampling distribution of the sample mean approaches a normal distribution as the sample size gets larger and larger.

(C) the sample mean gets closer and closer to the population mean as the sample size gets larger and larger.

(D) the sampling distribution of the sample mean approaches a normal distribution as the number of samples taken gets larger and larger.

26) The sampling distribution of $\bar{x}$

CH15

(A) shows how $\bar{x}$ fluctuates from sample to sample.

(B) shows how μ differs from population to population.

(C) shows an approximate standard normal distribution.

(D) shows where $\bar{x}$ falls along the distribution of x in the population.

27) An elevator in an apartment building has a load restriction of 12 people or 2000 pounds. The weights of the residents of the apartment building are normally distributed with mean $\mu = 153.3$ pounds and standard deviation $\sigma = 49.8$ pounds.

CH 15

If 12 residents are on the elevator at any given time, what is the probability the total weight of the group will exceed the load restriction?

(A) 0.6064 (B) 0.1762 (C) 0.3936 (D) 0.0700 (E) 0.8238

$$P(X_1+X_2+\cdots+X_{12}>2000)=P\left(\bar{x}>\frac{2000}{12}\right)=P\left(z>\frac{\frac{2000}{12}-153.3}{\frac{49.8}{\sqrt{12}}}\right)$$

$$=P(z>0.93)=1-0.8238=0.1762$$

28) Suppose we are testing the null hypothesis

CH17

$$H_o: \mu = 14 \text{ against the alternative } H_a: \mu \neq 14$$

→ z procedure.

for a normal population with $\sigma = 0.15$. A simple random sample of six observations is drawn from the population and we calculate the sample mean of these observations to be $\bar{x} = 14.133$. The P-value is

(A) 0.0300 (B) 0.0150 (C) 0.3734 (D) 0.1867

$z_0 = \frac{14.133 - 14}{0.15/\sqrt{6}} = 2.17$ Pvalue $= 2p(z < -2.17)$ or $2p(z > 2.17)$

$= 2 \times 0.015 = 0.03$

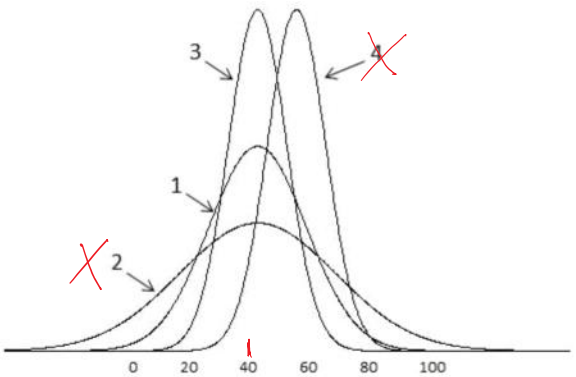
29) A random variable, x, has a population distribution that is normal with mean 40 and standard deviation 10. It is represented by normal curve 1 in the figure below. A simple random sample of size n is to be drawn from this population and the sample mean, $\bar{x}$, calculated. Which of the following normal curves could represent the sampling distribution of $\bar{x}$?

CH3

CH15

$x \sim N(40, 10)$

$\bar{x} \sim N(40, \frac{10}{\sqrt{n}})$



distribution of $\bar{x}$ has a larger s.d than 10.

(A) 2, 3

(B) 3, 4

(C) 3 only

(D) 2 only

CH17

Use the following information for the next TWO questions (Q30 and Q31):
A statistical study measured the maximum voluntary ventilation values for 20 healthy university students. The sample mean is 128.05 litres per minute. You are given that population standard deviation is σ = 38.50 litres per minute and that the distribution of maximum voluntary ventilation values is approximately normal.

30) The mean maximum voluntary ventilation value for healthy adults is 110 litres per minute. You wish to test whether university students have mean ventilation values that are different from that of healthy adults. That is, you wish to test $H_0 : \mu = 110$ vs. $H_a : \mu \neq 110$. Which of the following options best describes the correct decision?

(A) Reject H_0 at the 10% level of significance, but not at the 5% level.
(B) Reject H_0 at the 2% level of significance.
(C) Reject H_0 at the 5% level of significance, but not at the 2% level.
(D) Do not reject H_0 at the 10% level of significance.

$z_0 = \frac{128.05 - 110}{\frac{38.5}{\sqrt{20}}} = 2.15$

P value $= 2P(z < -2.15)$ or $2P(z > 2.15)$
$= 2 \times 0.0158 = 0.0316$

31) Which of the following is the correct 98% confidence interval for μ, the mean maximum voluntary ventilation value for all healthy university students?

CH16.

(A) (108, 148)
(B) (106, 150)
(C) (110, 146)
(D) (111, 145)

$128.05 \pm z^* \frac{38.05}{\sqrt{20}} = 128.05 \pm 19.79$
$= (108.26, 147.84)$

From Table C, $z^* = 2.326$

32) How does the t-distribution on n degrees of freedom compare to the standard normal distribution?

CH20

(A) The t-distribution has more probability in the middle.
(B) The t-distribution is centered on μ instead of 0.
(C) The t-distribution is similar to the standard normal distribution for small degrees of freedom.
(D) The t-distribution has more probability in the tails.

33) One problem with hypothesis testing is that a real effect or difference may not be detected. This problem is most likely to occur when

CH19

(A) the effect is large and the sample size is large.
(B) the effect is small and the sample size is small.
(C) the effect is small and the sample size is large.
(D) the effect is large and the sample size is small.

Use the following information for the next TWO questions (Q34 and Q35):
The national association of dieticians has prepared a pamphlet aimed at high schools students to try and encourage more students to consider a career as a dietician. The pamphlet claims that the average starting salary of a dietician is more than \$50,000 a year. You decide to test this hypothesis. You collect a simple random sample of the starting salaries of recent graduates who are now working as dieticians. You graph your data and determine that the graph is slightly skewed to the right, but there are no outliers. You have also determined that σ is known to be \$5,850.

34) When testing the pamphlet's hypothesis, which of the following statements is true?

CH18

(A) You can use the z-test if you use a large enough sample.

(B) You should not use the z-test or t-test, no matter what sample size you use.

(C) You can use the z-test no matter what sample size you use.

(D) You can use the t-test if you use a small sample.

35) Suppose you have decided to use the z-test (because of OR in spite of your answer to the previous question) to test the pamphlet's claim. You gather data on the starting salaries of 32 recent graduates who are now working as dieticians. You calculate the sample mean to be \$51,810. What is the alternative hypothesis and what is the p-value of your test?

CH17

$z_0 = \frac{51810 - 50000}{\frac{5850}{\sqrt{32}}} = 1.75$

$Pvalue = P(Z > 1.75)$

$= 1 - 0.9599 = 0.0401$

(A) $H_a : \mu > 50,000$; p-value $= 0.0802$

(B) $H_a : \mu \neq 50,000$; p-value $= 0.0802$

(C) $H_a : \mu > 50,000$; p-value $= 0.0401$

(D) $H_a : \mu \neq 50,000$; p-value $= 0.0401$

36) Is the average length of a movie 2 hours? A simple random sample of recent movie releases was used to calculate a 95% confidence interval for μ, the mean length of all recent movie releases. The resulting interval, in minutes, was (106.5, 118.8). In testing $H_0 : \mu = 120$ vs. $H_a : \mu \neq 120$, which of the following statements is true?

CH17, 98

(A) H_0 is rejected at the $\alpha = 5\%$ level of significance, but it is not clear whether it would be rejected at the $\alpha = 10\%$ level

As $\alpha = 10\%$, 90% CI is narrower than (106.5, 118.8)

(B) H_0 is rejected at the $\alpha = 5\%$ and 10% levels of significance

(C) We cannot use the confidence interval to test the hypothesis in this situation

(D) H_0 is not rejected at the $\alpha = 5\%$ level of significance

37) A researcher wishes to estimate the average time that Air Canada flights are delayed (length of time from stated departure time to the time the aircraft actually leaves the gate). He wishes to present his results in a 95% confidence interval with a margin of error of no more than 5 minutes. Previous studies have shown that the standard deviation of delay times is 30.1 minutes. What sample size is needed?

(A) 12 (B) 35 (C) 140 (D) 6

CH 8

$n = \left(z^* \frac{\sigma}{m}\right)^2 = \left(1.96 \times \frac{30.1}{5}\right)^2 = 139.22 \approx 140$ round up to 0

38) Mr. Chips produces potato chips and packages the chips in 200g bags. A consumer believes that the bags may contain less than 200g on average. A test of $H_0 : \mu = 200$ vs. $H_a : \mu < 200$ is conducted to determine if the bags are being underfilled. Mr. Chips has agreed to halt production to correct the problem if one is found. What statement best describes the consequences of a type I error?

CH 8

(A) Production keeps running even though there is a problem.

(B) Production is shut down for no real reason. → True.

(C) Production is shut down to correct the problem.

(D) Production keeps running because there is no issue.

39) Two tests of $H_0 : \mu = 0$ versus $H_a : \mu > 0$ are conducted on the same population independently by two different researchers. They both use the same sample size and the same level of significance of $\alpha = 0.05$. Which of the following will be the same for both researchers?

CH 17, 18

(A) The decision about whether or not to reject the null hypothesis.

(B) The value of the test statistic.

(C) The p-value of the test.

(D) None of the above.

z (or t) $= \frac{\bar{x} - 0}{\frac{\sigma}{\sqrt{n}}}$

$\bar{x}$ could be different. ⇒ z could be different. ⇒ P-value could be different.

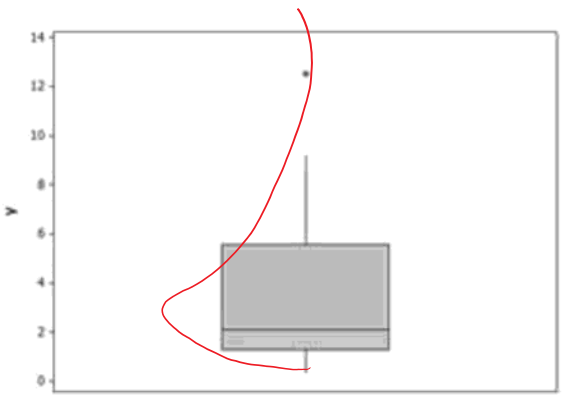
40) A simple random sample of 25 college males was obtained and each was asked to report their actual height and what they wished as their ideal height. A 95% confidence interval for μ_d = average difference between their ideal and actual heights was 0.8 inches to 2.2 inches. Based on this interval, which of the following hypotheses below (versus a two-sided alternative) can be rejected at a 5% level of significance?

(i) $H_0 : \mu_d = 0.5$

(ii) $H_0 : \mu_d = 2.0$

(A) (i) only
(B) (ii) only
(C) neither
(D) both
(E) Not enough information to determine.

41) A simple random sample of 20 observations was obtained in order to estimate the population mean μ. A 95% confidence interval for μ is given by 3.67 ± 1.58. A boxplot of the data shows



Which of the following options is a true statement about the confidence interval?

(A) The probability that the parameter μ is contained within the confidence interval is 95%.
(B) A higher level of confidence would make the interval narrower.
(C) The number of observations and the features of the plot indicate a confidence interval should not be constructed.
(D) In a test of $H_0 : \mu = 4$ versus $H_a : \mu \neq 4$, the null hypothesis would be rejected.

42) A physician wants to compare the blood pressures of six patients before and after treatment with a drug. The blood pressures are as follows:

CH 20

Patient	1	2	3	4	5	6
Before drug	168	171	182	167	174	170
After drug	171	170	180	173	178	172
difference	-3	1	2	-6	-4	-2

Calculate:

$\bar{x}_d = -2$, $s_d = 3.03$

$$t = \frac{-2-0}{\frac{3.03}{\sqrt{6}}} = -1.615$$

$|t| = 1.615$

The physician wants to test if there is a significant change in blood pressure levels before and after taking the drug. The absolute value of his test statistic is

(A) 0.659 (B) 1.615 (C) 2.000 (D) 0.719

43) The Canadian Automobile Association (CAA) recently performed a 5 mph crash test on several different types of large family cars (population 1) and several different types of large luxury cars (population 2). The front of each car was driven into an angle barrier and then the repair costs were calculated. The resulting 95% confidence interval for $\mu_1 - \mu_2$ was determined to be (−\$149, \$52). Which of the following interpretations of this confidence interval is correct?

CH 21

(A) The cost of repairing luxury cars is anywhere from \$52 to \$149 more than the cost of repairing family cars, on average.

(B) The cost of repairing luxury cars is anywhere from \$149 less to \$52 more than the cost of repairing family cars, on average.

(C) The cost of repairing luxury cars is anywhere from \$149 more to \$52 less than the cost of repairing family cars, on average.

(D) The cost of repairing luxury cars is anywhere from \$52 to \$149 less than the cost of repairing family cars, on average.

44) An investigator wishes to perform an hypothesis test to determine whether vegetarians (population 1) have a lower mean diastolic blood pressure than non-vegetarians (population 2). The investigator's null hypothesis is:

CH 21

(A) $\mu_1 - \mu_2 > 0$

(B) $\mu_1 - \mu_2 < 0$

(C) $\mu_1 - \mu_2 = 0$

(D) $\mu_1 - \mu_2 \neq 0$

45) A simple random sample of size 15 taken from a normally distributed population revealed a sample mean of 75 and a sample variance of 25. What is the upper limit of the 95% confidence interval for the population mean?

(A) 88.85 (B) 77.77 (C) 72.23 (D) 77.53

46) Two independent simple random samples were selected from normally distributed populations with unknown means and standard deviations. The sample from the first population with a sample size of 8 gave the following results: $\bar{x}_1 = 163.8$ and $s_1 = 6.2$. The sample of size 6 from the second population produced: $\bar{x}_2 = 179.6$ and $s_2 = 7.1$. What is the approximate margin of error in a 90% confidence interval for the difference $\mu_1 - \mu_2$?

(A) 6.44 (B) 7.32 (C) 9.34 (D) 7.12 (E) 2.82

47) In a study on heart surgery, one objective was to investigate the effect of drugs called beta-blockers on the pulse rate of patients during surgery. Subjects were randomly divided into two groups, with one receiving a beta-blocker and one receiving a placebo. You are given the following output from a statistical software package:

Two-sample t-test of $\mu_1 - \mu_2$

$H_0 : \mu_1 - \mu_2 = 0$ versus $H_0 : \mu_1 - \mu_2 > 0$

Difference between means = 5.1, test statistic = 2.42 with 29 degrees of freedom

Which of the following values is the smallest α level at which you can reject the null hypothesis?

(A) 0.020 (B) 0.050 (C) 0.025 (D) 0.010 (E) 0.100

48) A simple random sample of 75 students is taken from a large university on the West Coast to estimate the proportion of students whose parents bought a car for them when they left for school. When interviewed, 45 students in the sample responded that their parents bought them a car.

Using the plus 4 rule what is the 95% confidence interval for p, the population proportion of students whose parents bought a car for them when they left for college?

(A) (0.484, 0.706)

(B) (0.489, 0.711)

(C) (0.492, 0.708)

(D) (0.487, 0.703)

49) A noted psychic was tested for extrasensory perception. The psychic was presented with 200 cards face down and asked to determine if the card were one of five symbols: a star, a cross, a circle, a square, or three wavy lines. The psychic was correct in 50 cases. Let p represent the probability that the psychic correctly identifies the symbol on the card in a random trial. Assume the 200 trials can be treated as a simple random sample from the population of all guesses the psychic would make in his lifetime. Suppose you wished to see if there were evidence that the psychic is doing better than just guessing. To do this, you test the hypothesis $H_0 : p = 0.20$ versus $H_a : p > 0.20$.

What is the value of the test statistic?

(A) 1.77 (B) 1.63 (C) 1.96 (D) 0.05

50) What size of sample n would you need to estimate a proportion p with a margin of error 0.01 with 90% confidence? Assume $p^* = 0.2$.

(A) 4330 (B) 6765 (C) 6147 (D) 693

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