



01/151352

UNIVERSITI MALAYSIA TERENGGANU

FINAL EXAMINATION

SEMESTER I 2020/2021 SESSION (DEGREE PROGRAMME)

COURSE	:	KAEDAH STATISTIK UNTUK PERAKAUNAN DAN KEWANGAN
COURSE CODE	:	FNC3002
DATE	:	17 FEBRUARY 2021 (WEDNESDAY)
VENUE	:	OCEANIA
TIME	:	9.00 AM – 12.00 NOON (3 HOURS)

STUDENT NO.	:	_____
PROGRAMME	:	_____
SEAT NO.	:	_____

INSTRUCTIONS TO CANDIDATES

- i. Answer all 72 questions by using Oceania only.

DO NOT START ANSWERING UNTIL INSTRUCTED TO DO SO

These 120 questions will be categorised into chapters and sets in the exam system. Sets are based on similar storyline, for example question 21-24 is in one set. 72 questions will be selected based on chapters and sets for each student. Each student will be getting equal number of questions.

Chapter 9

- 1) The mean number of travel days per year for salespeople employed by three hardware distributors needs to be estimated with a 0.90 degree of confidence. For a small pilot study, the mean was 150 days and the standard deviation was 14 days. If the margin of error is two days, how many salespeople should be sampled?
 - A) 133
 - B) 452
 - C) 511
 - D) 2,100

- 2) A sample mean is the best point estimate of _____.
 - A) the sample standard deviation
 - B) the population standard deviation
 - C) the population median
 - D) the population mean

- 3) A sample standard deviation is the best point estimate of the _____.
 - A) population standard deviation
 - B) population range
 - C) population mode
 - D) population skewness

- 4) A random sample of 85 supervisors revealed that they worked an average of 6.5 years before being promoted. The population standard deviation was 1.7 years. Using the 0.95 level of confidence, what is the confidence interval for the population mean?
 - A) 6.99 and 7.99
 - B) 4.15 and 7.15
 - C) 6.14 and 6.86
 - D) 6.49 and 7.49

- 5) The mean weight of trucks travelling on a particular section of I-475 is not known. A state highway inspector needs an estimate of the population mean. He selects and weighs a random sample of 49 trucks and finds the mean weight is 15.8 tons. The population standard deviation is 3.8 tons. What is the 95% confidence interval for the population mean?
 - A) 14.7 and 16.9
 - B) 13.2 and 17.6
 - C) 10.0 and 20.0
 - D) 16.1 and 18.1

- 6) A bank wishes to estimate the mean credit card balance owed by its customers. The population standard deviation is estimated to be \$300. If a 98% confidence interval is used and a margin of error of \$75 is desired, how many customers should be sampled?
- A) 44
 - B) 212
 - C) 629
 - D) 87
- 7) Which of the following is a point estimate for the population mean, μ ?
- A) σ
 - B) x/n
 - C) \bar{X}
 - D) s
- 8) Mileage tests were conducted on a randomly selected sample of 100 newly developed automobile tires. The results showed that the mean tread life was 50,000 miles, with a standard deviation of 3,500 miles. What is the best estimate of the mean tread life in miles for the entire population of these tires?
- A) 50,000
 - B) 3,500
 - C) 500
 - D) 35
- 9) What is the best interpretation of a 96% confidence level?
- A) There's a 96% chance that the given interval includes the true value of the population parameter.
 - B) Approximately 96 out of 100 such intervals would include the true value of the population parameter.
 - C) There's a 4% chance that the given interval does not include the true value of the population parameter.
 - D) The interval contains 96% of all sample means.
- 10) Which statement(s) is (are) correct about the t -distribution?
- A) The mean is zero.
 - B) Its shape is symmetric.
 - C) Its dispersion is based on degrees of freedom.
 - D) All of the choices are correct.
- 11) What kind of distribution is the t -distribution?
- A) Continuous
 - B) Discrete
 - C) Subjective
 - D) A z -distribution
- 12) How is the t -distribution similar to the standard z -distribution?

- A) Both are discrete distributions.
 - B) Both are skewed distributions.
 - C) Both are families of distributions.
 - D) Both are continuous distributions.
- 13) A random sample of 20 items is selected from a population. When computing a confidence interval for the population mean, what number of degrees of freedom should be used to determine the appropriate t -value?
- A) 20
 - B) 19
 - C) 21
 - D) 25
- 14) Of the following characteristics, the t -distribution and z -distribution are the same in all *but one*. Which one is it?
- A) Continuous
 - B) Symmetrical
 - C) Bell-shaped
 - D) Mean = 0 and standard deviation = 1
- 15) A confidence interval for a population mean _____.
- A) estimates the population standard deviation
 - B) estimates the population range
 - C) estimates a likely interval for a population mean
 - D) estimates likelihood or probability
- 16) Knowing the population standard deviation, a 95% confidence interval infers that the population mean _____.
- A) is too large
 - B) is within ± 1.96 standard deviations of the sample mean
 - C) is between 0 and 100%
 - D) is within ± 1.96 standard errors of the sample mean
- 17) When a confidence interval for a population mean is constructed from sample data, _____.
- A) we can conclude that the population mean is in the interval
 - B) we can conclude, for an infinite number of samples and corresponding confidence intervals, that the population mean is in a stated percentage of the intervals
 - C) we can conclude that the population mean is not in the interval
 - D) we cannot make any inferences
- 18) The distribution of Student's t has _____.
- A) a mean that depends on the sample size and a standard deviation of one

- B) a mean of zero and a standard deviation that depends on the sample size
- C) a mean of zero and a standard deviation of one
- D) a mean of one and a standard deviation of one

- 19) The z-score or z-value corresponding to a 95.34% confidence interval is _____.
- A) 1.96
 - B) 1.90
 - C) 1.65
 - D) 1.99
- 20) As the sample size for a t -distribution increases, the differences between the t -distribution and the standard normal distribution _____.
- A) are unchanged and remain the same
 - B) become smaller, as the t -distribution approaches the standard normal distribution
 - C) become greater
 - D) are evident because the tails of the t -distribution become thicker

Chapter 10

- 21) Sales at a fast-food restaurant average \$6,000 per day. The restaurant decided to introduce an advertising campaign to increase daily sales. To determine the effectiveness of the advertising campaign, a sample of 49 days of sales were taken. They found that the average daily sales were \$6,300 per day. From past history, the restaurant knew that its population standard deviation is about \$1,000. If the level of significance is 0.025, have sales increased as a result of the advertising campaign?
- A) Fail to reject the null hypothesis.
 - B) Reject the null hypothesis and conclude the mean is higher than \$6,000 per day.
 - C) Reject the null hypothesis and conclude the mean is lower than \$6,000 per day.
 - D) Reject the null hypothesis and conclude that the mean is equal to \$6,000 per day.
- 22) Sales at a fast-food restaurant average \$6,000 per day. The restaurant decided to introduce an advertising campaign to increase daily sales. To determine the effectiveness of the advertising campaign, a sample of 49 days of sales were taken. They found that the average daily sales were \$6,300 per day. From past history, the restaurant knew that its population standard deviation is about \$1,000. If the level of significance is 0.01, have sales increased as a result of the advertising campaign?
- A) Fail to reject the null hypothesis.
 - B) Reject the null hypothesis and conclude the mean is higher than \$6,000 per day.
 - C) Reject the null hypothesis and conclude the mean is lower than \$6,000 per day.
 - D) Reject the null hypothesis and conclude that the mean is equal to \$6,000 per day.

- 23) Sales at a fast-food restaurant average \$6,000 per day. The restaurant decided to introduce an advertising campaign to increase daily sales. To determine the effectiveness of the advertising campaign, a sample of 49 days of sales were taken. They found that the average daily sales were \$6,300 per day. From past history, the restaurant knew that its population standard deviation is about \$1,000. The restaurant wishes to test whether sales have increased as a result of the advertising campaign. If the level of significance is 0.05, what is the decision?
- A) Fail to reject the null hypothesis.
 - B) Reject the null hypothesis and conclude the mean is higher than \$6,000 per day.
 - C) Reject the null hypothesis and conclude the mean is lower than \$6,000 per day.
 - D) Reject the null hypothesis and conclude that the mean is equal to \$6,000 per day.
- 24) Sales at a fast-food restaurant average \$6,000 per day. The restaurant decided to introduce an advertising campaign to increase daily sales. To determine the effectiveness of the advertising campaign, a sample of 49 days of sales were taken. They found that the average daily sales were \$6,400 per day. From past history, the restaurant knew that its population standard deviation is about \$1,000. The value of the test statistic is _____.
- A) 2.800
 - B) 6,000
 - C) 6,400
 - D) 1.960
- 25) Consider a right-tailed test (upper tail) and a sample size of 40 at the 95% confidence level. The value of t is _____.
- A) +2.023
 - B) -2.023
 - C) -1.685
 - D) +1.685
- 26) Consider a two-tailed test with a level of confidence of 99%. The p -value is determined to be 0.05; therefore, the null hypothesis _____.
- A) should not be rejected
 - B) must be rejected
 - C) may or may not be rejected depending on the square root of the sample size
 - D) is the same as the alternative hypothesis
- 27) Consider a two-tailed test with a level of confidence of 80.30%. The z -value is _____.
- A) 2.58
 - B) 1.29
 - C) 0.85
 - D) 1.96
- 28) Consider a left-tailed test, where the alpha is 0.10. If the sample size n for this test is 49, then the t -statistic will have a value of _____.

- A) +1.677
- B) -1.677
- C) +1.299
- D) -1.299

29) The probability of a Type II error is represented by _____.

- A) α
- B) β
- C) the Type I error
- D) σ

30) The probability of a Type II error is directly related to _____.

- A) α
- B) the standard deviation
- C) the Type I error
- D) the difference between the hypothesized mean and the critical value of the sample mean

31) The mean weight of newborn infants at a community hospital is 6.6 pounds. A sample of seven infants is randomly selected and their weights at birth are recorded as 9.0, 7.3, 6.0, 8.8, 6.8, 8.4, and 6.6 pounds. Does the sample data show a significant increase in the average birthrate at a 5% level of significance?

- A) Fail to reject the null hypothesis and conclude the mean is 6.6 pounds.
- B) Reject the null hypothesis and conclude the mean is lower than 6.6 pounds.
- C) Reject the null hypothesis and conclude the mean is greater than 6.6 pounds.
- D) Cannot calculate because the population standard deviation is unknown.

32) A hypothesis regarding the weight of newborn infants at a community hospital is that the mean is 6.6 pounds. A sample of seven infants is randomly selected and their weights at birth are recorded as 9.0, 7.3, 6.0, 8.8, 6.8, 8.4, and 6.6 pounds. What is the decision for a statistically significant change in average weights at birth at the 5% level of significance?

- A) Fail to reject the null hypothesis.
- B) Reject the null hypothesis and conclude the mean is higher than 6.6 pounds.
- C) Reject the null hypothesis and conclude the mean is lower than 6.6 pounds.
- D) Cannot calculate because the population standard deviation is unknown.

33) A hypothesis regarding the weight of newborn infants at a community hospital is that the mean is 6.6 pounds. A sample of seven infants is randomly selected and their weights at birth are recorded as 9.0, 7.3, 6.0, 8.8, 6.8, 8.4, and 6.6 pounds. What is the sample standard deviation?

- A) 1.177
- B) 1.188
- C) 1.386
- D) 1.090

- 34) A hypothesis regarding the weight of newborn infants at a community hospital is that the mean is 6.6 pounds. A sample of seven infants is randomly selected and their weights at birth are recorded as 9.0, 7.3, 6.0, 8.8, 6.8, 8.4, and 6.6 pounds. What is the sample variance?
- A) 1.177
B) 6.6
C) 1.386
D) 7.6
- 35) A hypothesis regarding the weight of newborn infants at a community hospital is that the mean is 6.6 pounds. A sample of seven infants is randomly selected and their weights at birth are recorded as 9.0, 7.3, 6.0, 8.8, 6.8, 8.4, and 6.6 pounds. What is the sample mean?
- A) 6.6
B) 7.6
C) 1.177
D) 2.447
- 36) A hypothesis regarding the weight of newborn infants at a community hospital is that the mean is 6.6 pounds. A sample of seven infants is randomly selected and their weights at birth are recorded as 9.0, 7.3, 6.0, 8.8, 6.8, 8.4, and 6.6 pounds. If $\alpha = 0.05$, what is the critical value?
- A) ± 1.943
B) 0
C) ± 2.365
D) ± 2.447
- 37) A hypothesis regarding the weight of newborn infants at a community hospital is that the mean is 6.6 pounds. A sample of seven infants is randomly selected and their weights at birth are recorded as 9.0, 7.3, 6.0, 8.8, 6.8, 8.4, and 6.6 pounds. What are the degrees of freedom?
- A) 7
B) 8
C) 6
D) 6.6
- 38) A hypothesis regarding the weight of newborn infants at a community hospital is that the mean is 6.6 pounds. A sample of seven infants is randomly selected and their weights at birth are recorded as 9.0, 7.3, 6.0, 8.8, 6.8, 8.4, and 6.6 pounds. What is the alternate hypothesis?
- A) $H_1: \mu = 6.6$
B) $H_1: \mu \neq 6.6$
C) $H_1: \mu \geq 6.6$
D) $H_1: \mu > 7.6$

- 39) A hypothesis regarding the weight of newborn infants at a community hospital is that the mean is 6.6 pounds. A sample of seven infants is randomly selected and their weights at birth are recorded as 9.0, 7.3, 6.0, 8.8, 6.8, 8.4, and 6.6 pounds. The null hypothesis is _____.
- A) $H_0: \mu = 6.6$
 - B) $H_0: \mu \geq 6.6$
 - C) $H_0: \mu > 7.6$
 - D) $H_0: \mu \leq 7.6$
- 40) The mean annual incomes of certified welders are normally distributed with the mean of \$50,000 and a population standard deviation of \$2,000. The ship building association wishes to find out whether their welders earn more or less than \$50,000 annually. A sample of 100 welders is taken and the mean annual income of the sample is \$50,350. If the level of significance is 0.10, what conclusion should be drawn?
- A) Do not reject the null hypothesis as the test statistic is less than the critical value of z .
 - B) Do not reject the null hypothesis as the test statistic is less than the critical value of t .
 - C) Reject the null hypothesis as the test statistic is greater than the critical value of t .
 - D) Reject the null hypothesis as the test statistic is greater than the critical value of z .

Chapter 11

- 41) Which of the following are most likely to be dependent samples?
- A) A study that compares the mean wait times at two different hospital emergency rooms
 - B) A study that compares the salaries earned by men and women in the same job position
 - C) A study that compares standardized test scores before and after a course is taken
 - D) A study that compares the weight gain for puppies who eat two different brands of food
- 42) Which of the following tests is most sensitive in detecting a significant difference in sample means?
- A) A hypothesis test based on independent samples
 - B) A hypothesis test based on dependent samples
 - C) A hypothesis test when the population standard deviation is known
 - D) Any hypothesis test based on the t distribution

- 43) A district sales manager wishes to determine whether there is a difference in mean daily sales volume between two stores in his district. He collects daily sales volume for the month of June to do the analysis. Assume that the population standard deviations are unknown and unequal. The hypothesis test is to be conducted using the 0.01 level of significance. Partial output of his results from Excel can be found in the table below:

	Store 1	Store 2
Sample size (n)	30	30
Sample mean daily sales volume (in \$1,000)	15	19
Sample standard deviation (in \$1,000)	5.2	6.1
Degrees of freedom	56	

What conclusion should we draw based on the sample evidence?

- A) Fail to reject the null hypothesis and conclude the means are equal.
 B) Reject the null hypothesis and conclude the means are different.
 C) Reject the alternate hypothesis and conclude the means are equal.
 D) Fail to reject the null hypothesis.
- 44) A district sales manager wishes to determine whether there is a difference in mean daily sales volume between two stores in his district. He collects daily sales volume for the month of June to do the analysis. Assume that the population standard deviations are unknown and unequal. The hypothesis test is to be conducted using the 0.01 level of significance. Partial output of his results from Excel can be found in the table below:

	Store 1	Store 2
Sample size (n)	30	30
Sample mean daily sales volume (in \$1,000)	15	19
Sample standard deviation (in \$1,000)	5.2	6.1
Degrees of freedom	56	

What is the value of the test statistic?

- A) -2.733
 B) +1.960
 C) ± 2.667
 D) -2.395

- 45) A district sales manager wishes to determine whether there is a difference in mean daily sales volume between two stores in his district. He collects daily sales volume for the month of June to do the analysis. Assume that the population standard deviations are unknown and unequal. The hypothesis test is to be conducted using the 0.01 level of significance. Partial output of his results from Excel can be found in the table below:

	Store 1	Store 2
Sample size (n)	30	30
Sample mean daily sales volume (in \$1,000)	15	19
Sample standard deviation (in \$1,000)	5.2	6.1
Degrees of freedom	56	

What is the critical value?

- A) -1.645
 B) ± 1.960
 C) ± 2.667
 D) ± 2.395
- 46) The following table shows sample salary information for employees with bachelor's and associate's degrees for a large company in the Southeast United States.

	Bachelor's	Associate's
Sample size (n)	81	49
Sample mean salary (in \$1,000)	60	51
Population variance (σ^2)	175	90

The point estimate of the difference between the means of the two populations is _____.

- A) 32
 B) 9
 C) -4.5
 D) 4.5
- 47) Use the following table to determine whether or not there is a significant difference between the average hourly wages at two manufacturing companies. Assume a level of significance of 0.05.

Manufacturer 1	Manufacturer 2
$n_1 = 81$	$n_2 = 64$
$\bar{x}_1 = \$15.80$	$\bar{x}_2 = \$15.00$

$\sigma_1 = \$3.00$	$\sigma_2 = \$2.25$
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What conclusion should we draw based on the sample evidence?

- A) Fail to reject the null hypothesis and conclude the means are different.
- B) Reject the null hypothesis and conclude the means are different.
- C) Reject the alternate hypothesis and conclude the means are different.
- D) Fail to reject the null hypothesis and conclude the means are equal.

- 48) Use the following table to determine whether or not there is a significant difference between the average hourly wages at two manufacturing companies. Assume a level of significance of 0.05.

Manufacturer 1	Manufacturer 2
$n_1 = 81$	$n_2 = 64$
$\bar{x}_1 = \$15.80$	$\bar{x}_2 = \$15.00$
$\sigma_1 = \$3.00$	$\sigma_2 = \$2.25$

What is the critical value of this test?

- A) ± 1.977
- B) ± 1.960
- C) $+1.645$
- D) $+1.834$

- 49) Use the following table to determine whether or not there is a significant difference between the average hourly wages at two manufacturing companies. Assume a level of significance of 0.05.

Manufacturer 1	Manufacturer 2
$n_1 = 81$	$n_2 = 64$
$\bar{x}_1 = \$15.80$	$\bar{x}_2 = \$15.00$
$\sigma_1 = \$3.00$	$\sigma_2 = \$2.25$

The p -value is _____.

- A) 0.0336
- B) 0.0672
- C) 0.4664
- D) 1.960

- 50) Use the following table to determine whether or not there is a significant difference between the average hourly wages at two manufacturing companies. Assume a level of significance of 0.05.

Manufacturer 1	Manufacturer 2
$n_1 = 81$	$n_2 = 64$
$\bar{x}_1 = \$15.80$	$\bar{x}_2 = \$15.00$
$\sigma_1 = \$3.00$	$\sigma_2 = \$2.25$

What is the test statistic for the difference between the means?

- A) 1.960
 B) 1.977
 C) 1.287
 D) 1.834
- 51) Consider independent simple random samples that are taken to test the difference between the means of two populations. The variances of the populations are unknown but are assumed to be equal. The sample sizes of each population are $n_1 = 37$ and $n_2 = 45$. The appropriate distribution to use is the _____.
- A) t -distribution with $df = 82$
 B) t -distribution with $df = 81$
 C) t -distribution with $df = 41$
 D) t -distribution with $df = 80$
- 52) When testing the hypothesized equality of two population means, the implied null hypothesis is _____.
- A) $H_0: \mu_1 = 0$
 B) $H_0: \mu_1 - \mu_2 = 0$
 C) $H_0: \mu_2 = 0$
 D) $H_0: \mu_1 - \mu_2 \neq 0$
- 53) Accounting procedures allow a business to evaluate its inventory costs based on two methods: LIFO (last in first out) or FIFO (first in first out). A manufacturer evaluated its finished goods inventory (in \$000s) for five products with the LIFO and FIFO methods. To analyze the difference, they computed FIFO - LIFO for each product. Based on the following results, does the LIFO method result in a lower cost of inventory than the FIFO method?

Product	FIFO (F)	LIFO (L)
1	225	221
2	119	100
3	100	113
4	212	200
5	248	245

This example is what type of test?

- A) A one-sample test of means
- B) A two-sample test of means
- C) A paired t-test
- D) A test of proportions

- 54) Accounting procedures allow a business to evaluate its inventory costs based on two methods: LIFO (last in first out) or FIFO (first in first out). A manufacturer evaluated its finished goods inventory (in \$000s) for five products with the LIFO and FIFO methods. To analyze the difference, they computed FIFO – LIFO for each product. Based on the following results, does the LIFO method result in a lower cost of inventory than the FIFO method?

Product	FIFO (F)	LIFO (L)
1	225	221
2	119	100
3	100	113
4	212	200
5	248	245

What is the decision at the 5% level of significance?

- A) Fail to reject the null hypothesis and conclude LIFO is more effective.
 - B) Reject the null hypothesis and conclude LIFO is more effective.
 - C) Reject the alternate hypothesis and conclude LIFO is more effective.
 - D) Fail to reject the null hypothesis and conclude LIFO is not more effective.
- 55) Accounting procedures allow a business to evaluate its inventory costs based on two methods: LIFO (last in first out) or FIFO (first in first out). A manufacturer evaluated its finished goods inventory (in \$000s) for five products with the LIFO and FIFO methods. To analyze the difference, they computed FIFO – LIFO for each product. We would like to determine if the LIFO method results in a lower cost of inventory than the FIFO method. The company wishes to test this hypothesis at the 0.05 level of significance.

Product	FIFO (F)	LIFO (L)
1	225	221
2	119	100
3	100	113
4	212	200
5	248	245

What is the value of the test statistic?

- A) +0.933
- B) ±2.776
- C) +0.47
- D) +2.132

- 56) Accounting procedures allow a business to evaluate their inventory costs based on two methods: LIFO (last in first out) or FIFO (first in first out). A manufacturer evaluated its finished goods inventory (in \$000s) for five products with the LIFO and FIFO methods. To analyze the difference, they computed FIFO – LIFO for each product. We would like to determine if the LIFO method results in a lower cost of inventory than the FIFO method.

Product	FIFO (F)	LIFO (L)
1	225	221
2	119	100
3	100	113
4	212	200
5	248	245

If you use the 5% level of significance, what is the critical value?

- A) +2.132
 - B) +1.645
 - C) +2.262
 - D) ±2.776
- 57) Accounting procedures allow a business to evaluate their inventory costs based on two methods: LIFO (last in first out) or FIFO (first in first out). A manufacturer evaluated its finished goods inventory (in \$000s) for five products with the LIFO and FIFO methods. To analyze the difference, they computed FIFO – LIFO for each product. We would like to determine if the LIFO method results in a lower cost of inventory than the FIFO method.

Product	FIFO (F)	LIFO (L)
1	225	221
2	119	100
3	100	113
4	212	200
5	248	245

What are the degrees of freedom?

- A) 4
- B) 5
- C) 15
- D) 10

58) A company is researching the effectiveness of a new website design to decrease the time to access a website. Five website users were randomly selected, and their times (in seconds) to access the website with the old and new designs were recorded. To compare the times, they computed new website design time – old website design time. The results are shown here.

User	Old Website Design	New Website Design
A	30	25
B	45	30
C	25	20
D	32	30
E	28	27

For a 0.01 significance level, what is the decision regarding the hypothesis that the new design was effective in decreasing the time to access the website?

- A) Reject the null hypothesis and conclude that the new design reduced the mean access times.
- B) Reject the null hypothesis and conclude that the new design did not reduce the mean access times.
- C) Fail to reject the null hypothesis and conclude that the new design did not reduce the mean access times.
- D) Fail to reject the null hypothesis and conclude that the new design did reduce the mean access times.

59) A company is researching the effectiveness of a new website design to decrease the time to access a website. Five website users were randomly selected, and their times (in seconds) to access the website with the old and new designs were recorded. To compare the times, they computed new website design time – old website design time. The results follow.

User	Old Website Design	New Website Design
A	30	25
B	45	30
C	25	20
D	32	30
E	28	27

For a 0.01 significance level, what is the critical value?

- A) -2.256
- B) -1.895
- C) -3.747
- D) -2.447

- 60) A company is researching the effectiveness of a new website design to decrease the time to access a website. Five website users were randomly selected, and their times (in seconds) to access the website with the old and new designs were recorded. To compare the times, they computed new website design time - old website design time. The company wishes to test its hypothesis at the 0.01 level of significance. The results are shown here.

User	Old Website Design	New Website Design
A	30	25
B	45	30
C	25	20
D	32	30
E	28	27

What is the value of the test statistic?

- A) -2.256
- B) -1.895
- C) -3.747
- D) -2.447

Chapter 13

- 61) An example of a way to rescale a variable to create a linear relationship is _____.
- A) dividing all the values of the dependent variable by 5
 - B) computing the log of all values of the dependent and independent variables
 - C) adding 50 to all of the values of the dependent and independent variables
 - D) adding the values of the dependent and independent variables to create a new dependent variable
- 62) In regression, if the relationship between the dependent and independent variables is nonlinear, a linear relationship between the variables can be achieved by _____.
- A) including an interaction term
 - B) multiplying by 100
 - C) rescaling the variables
 - D) adding another independent variable
- 63) If the correlation coefficient has a negative value, then the coefficient of determination _____.

- A) can take on either a negative or positive value
 B) must be positive
 C) will also have a negative value
 D) will equal zero
- 64) Consider the following regression equation: $Y = 30 + 8X$. If $SSE = 720$ and $SS\ Total = 1,200$, then the correlation coefficient is _____.
- A) -0.632
 B) $+0.70$
 C) $+0.632$
 D) -0.70
- 65) Consider a regression and correlation analysis where $r^2 = 1$. We know that _____.
- A) SSE must be greater than one
 B) SSE must be greater than $SS\ Total$
 C) SSE can take on any negative or positive value
 D) SSE must equal to zero
- 66) Consider a regression analysis, where the correlation coefficient is 0.18 . Then, the coefficient of determination is _____.
- A) 0.3636
 B) 0.0324
 C) 0.4243
 D) 1.1618
- 67) Consider the following regression analysis between sales (Y in \$1,000) and social media advertising (X in dollars).
- $$\hat{Y} = 55,000 + 7X$$
- The regression equation implies that an _____.
- A) increase of \$7 in advertising is associated with an increase of \$7,000 in sales
 B) increase of \$1 in advertising is associated with an increase of \$7 in sales
 C) increase of \$1 in advertising is associated with an increase of \$62,000 in sales
 D) increase of \$1 in advertising is associated with an increase of \$7,000 in sales
- 68) The value of the correlation coefficient (r) _____.
- A) can be equal to the value of the coefficient of determination (r^2)
 B) can never be equal to the value of the coefficient of determination (r^2)
 C) can range from -2.0 to $+2.0$
 D) is generally larger than the value of the coefficient of determination

69) A regression analysis yields the following information:

$$\hat{Y} = 2.21 + 1.49X$$

$$n = 10, s_{y,x} = 1.66, \sum X = 32$$

$$\sum X^2 = 134, \sum (X - \bar{X})^2 = 31.6$$

Compute the 95% prediction interval when $X = 4$.

- A) 0.0, 4.05
- B) 2.67, 5.33
- C) 4.12, 12.22
- D) 6.84, 9.50

70) A regression analysis yields the following information:

$$\hat{Y} = 2.21 + 1.49X$$

$$n = 10, s_{y,x} = 1.66, \sum X = 32$$

$$\sum X^2 = 134, \sum (X - \bar{X})^2 = 31.6$$

Compute the 95% confidence interval when $X = 4$.

- A) 2.67, 5.33
- B) 0.0, 4.05
- C) 6.84, 9.50
- D) 4.12, 12.22

71) Using the following information.

		Coefficients		
Intercept		-12.8094		
Independent variable		2.1794		
ANOVA				
	df	SS	MS	F
Regression	1	12,323.56	12,323.56	90.0481
Residual	8	1,094.842	136.8553	
Total	9	13,418.4		

Estimate the value of \hat{Y} when $X = 4$.

- A) 10.45
- B) 3.73
- C) 8.718
- D) -4.092

72) Using the following information.

		Coefficients		
Intercept		-12.8094		
Independent variable		2.1794		
ANOVA				
	df	SS	MS	F
Regression	1	12,323.56	12,323.56	90.0481
Residual	8	1,094.842	136.8553	
Total	9	13,418.4		

If testing the hypothesis $H_0: \rho = 0$, the computed t -statistic is _____.

- A) 9.49
- B) 8.84
- C) 8.18
- D) Cannot be computed

73) Using the following information.

		Coefficients		
Intercept		-12.8094		
Independent variable		2.1794		
ANOVA				
	df	SS	MS	F
Regression	1	12,323.56	12,323.56	90.0481
Residual	8	1,094.842	136.8553	
Total	9	13,418.4		

The regression equation is _____.

- A) $\hat{Y} = 2.1794 - 12.8094X$
- B) $\hat{Y} = -12.8094 + 2.1794X$
- C) $12.8094X = 2.1794\hat{Y}$
- D) $X = -12.8094 + 2.1794\hat{Y}$

74) Using the following information.

	Coefficients

Intercept		-12.8094		
Independent variable		2.1794		
ANOVA				
	df	SS	MS	F
Regression	1	12,323.56	12,323.56	90.0481
Residual	8	1,094.842	136.8553	
Total	9	13,418.4		

What is the correlation coefficient?

- A) 0.9184
- B) 0.9583
- C) -0.9583
- D) 0.9004

75) Using the following information.

		Coefficients		
Intercept		-12.8094		
Independent variable		2.1794		
ANOVA				
	df	SS	MS	F
Regression	1	12,323.56	12,323.56	90.0481
Residual	8	1,094.842	136.8553	
Total	9	13,418.4		

What is the coefficient of determination? Round the percentage to one decimal point.

- A) 91.8%
- B) 8.2%
- C) 90.0%
- D) 136.9%

76) Using the following information.

		Coefficients		
Intercept		-12.8094		
Independent variable		2.1794		
ANOVA				
	df	SS	MS	F
Regression	1	12,323.56	12,323.56	90.0481
Residual	8	1,094.842	136.8553	

Total	9	13,418.4		
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What is the standard error of the estimate?

- A) 136.8552
- B) 1,094.842
- C) 11.6985
- D) 13,418.4

- 77) A sales manager for an advertising agency believes there is a relationship between the number of contacts that a salesperson makes and the amount of sales dollars earned. A regression analysis shows the following results.

	Coefficients	Standard Error	t-Stat	p-value
Intercept	-12.201	6.560	-1.860	0.100
Number of contacts	2.195	0.176	12.505	0.000

What is the regression equation?

- A) $\hat{Y} = 2.195 - 12.201X$
- B) $\hat{Y} = -12.201 + 2.195X$
- C) $\hat{Y} = 12.201 + 2.195X$
- D) $\hat{Y} = 2.195 + 12.201X$

- 78) A sales manager for an advertising agency believes there is a relationship between the number of contacts that a salesperson makes and the amount of sales dollars earned. A regression analysis shows the following results.

	Coefficients	Standard Error	t-Stat	p-value
Intercept	-12.201	6.560	-1.860	0.100
Number of contacts	2.195	0.176	12.505	0.000

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	13,555.42	13,555.42	156.38	0.00
Residual	8	693.48	86.68		
Total	9	14,248.9			

Assume that $\bar{x} = 33.4$ and $\sum(x - \bar{x})^2 = 2814.4$. The 95% prediction interval for a particular person making 30 calls is _____.

- A) 55.8, 51.5
- B) 51.4, 55.9
- C) 46.7, 60.6
- D) 31.1, 76.2

79) A sales manager for an advertising agency believes there is a relationship between the number of contacts that a salesperson makes and the amount of sales dollars earned. A regression analysis shows the following results.

	Coefficients	Standard Error	t-Stat	p-value
Intercept	-12.201	6.560	-1.860	0.100
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ANOVA					
	df	SS	MS	F	Significance F
Regression	1	13,555.42	13,555.42	156.38	0.00
Residual	8	693.48	86.68		
Total	9	14,248.9			

Assume that $\bar{x} = 33.4$ and $\sum(x - \bar{x})^2 = 2814.4$. Rounding to one decimal place, the 95% confidence interval for 30 calls is _____.

- A) 55.8, 51.5
- B) 51.4, 55.9
- C) 46.7, 60.6
- D) 31.1, 76.2

80) A sales manager for an advertising agency believes there is a relationship between the number of contacts that a salesperson makes and the amount of sales dollars earned. A regression ANOVA shows the following results.

ANOVA					
	df	SS	MS	F	Significance F
Regression	1.00	13,555.42	13,555.42	156.38	0.00
Residual	8.00	693.48	86.68		
Total	9.00	14,248.90			

What is the value of the coefficient of determination?

- A) -0.9513
- B) 0.9754
- C) 0.6319
- D) 0.9513

Chapter 17

- 81) If the average wage was \$6.76 per hour in 1998 and \$14.90 per hour last month, what is the index of hourly wages for last month based on the 1998 information?
- A) 100.0
 - B) 220.4
 - C) 251.5
 - D) 194.3
- 82) The Bureau of the Census reported that the farm population dropped from 30.5 million in 1940 to 8.5 million in 1999. What is the index for 1999 based on 1940?
- A) 469.7
 - B) 100.0
 - C) 21.3
 - D) 27.9
- 83) Besides measuring change in the prices of goods and services, the Consumer Price Index has a number of other applications such as _____.
- A) to determine real disposable personal income
 - B) to deflate sales or other data series
 - C) to find the purchasing power of the dollar
 - D) All of these answers are correct.
- 84) Sean McCarthy earns \$22,000 a year, while John Nowak earns \$35,000. What is John's income as an index using Sean's income as the base?
- A) 175.0
 - B) 159.0
 - C) 100.0
 - D) 57.1
- 85) The wholesale price of a straight-back desk chair in 2004 was \$70; in 2005, \$80; and in 2006, \$65. What were the indexes for 2005 and 2006 using 2004 = 100?
- A) 115.0 and 90.0
 - B) 114.3 and 92.9
 - C) 1.24 and 0.93
 - D) 1.15 and 0.9

- 86) An index of clothing prices for 2006 based on 1985 is to be constructed. The prices for 1985 and 2006 and the quantity consumed in 1985 are shown in the following table.

ITEM	1985 Price	1985 Amount Sold	2006 Price
Dress (each)	RM30	500	RM60
Shoes (pair)	RM45	1200	RM99

Assuming that the number sold remained constant (i.e., the same number were sold in 2006 as in 1985), what is the weighted index of price for 2006 using 1985 as the base?

- A) 215.7
 B) 214.5
 C) 48.4
 D) 47.8
- 87) Real income is computed by _____.
- A) dividing money income by the CPI and multiplying by 100
 B) dividing the CPI by money income and multiplying by 100
 C) multiplying money income by the CPI
 D) subtracting the CPI from money income
- 88) Prices and the number produced for selected agricultural items are as follows.

	Price		Production	
	1980	2006	1980	2006
Wheat (bushel)	\$2.00	\$4.00	100	700
Eggs (dozen)	\$0.50	\$0.90	1100	800
Meat (cwt.)	\$60.00	\$70.00	50	110

Using the Laspeyres method, what is the price index of agricultural production for 2006 (1980 = 100)?

- A) 299.2
 B) 129.7
 C) 117.1
 D) 130.4
- 89) The number of items produced and the price per item for the Duffy Manufacturing Company are as follows.

	Price		Production	
	1990	2006	1990	2006
Shear pins (box)	\$2.00	\$4.00	10,000	9,000
Cutting Compound (lb.)	\$1.00	\$6.00	600	200
Tie Rods (each)	\$10.00	\$8.00	3,500	5,000

What is the value index of production for 2006 using 1990 as the base period?

- A) 115.2
- B) 138.8
- C) 111.6
- D) 127.1

- 90) As chief statistician for the county, you want to compute and publish every year a special-purpose index, which you plan to call Index of County Business Activity. Three series seem to hold promise as the basis for the index; namely, the price of cotton, the number of new cars sold, and the rate of money turnover for the county (published by a local bank). Arbitrarily you decide that money turnover should have a weight of 60 percent; number of new cars sold, 30 percent; and the price of cotton, 10 percent.

	Price of Cotton (per pound)	Number of Cars Sold	Rate of Money Turnover (an index)
1981	\$0.20	100,000	80
2006	\$0.50	80,000	120

What is the Index of County Business Activity for 1981 (the base year) and for 2006?

- A) 100 for 1981, 139 for 2006
 - B) 139 for 1981, 100 for 2006
 - C) 100 for 1981, 61 for 2006
 - D) 61 for 1981, 100 for 2006
- 91) The Consumer Price Index in June 2006 was 156.3 (1982–84 = 100). What does this indicate about prices from 1982–84 to June 2006?
- A) They rose 56.3%.
 - B) They rose 100.0%.
 - C) They rose 156.3%.
 - D) They declined 156.3%.
- 92) The following is Jim Walker's income for 1995 and 2007.

Year	Income	CPI (1982–1984 = 100)
1995	\$37,000	107.6
2007	\$67,000	180.0

What was Jim's real income for 2007?

- A) \$34,387
- B) \$67,000
- C) \$37,222
- D) \$38,908

- 93) The take-home pay of an employee working in an urban area for 1993 and 2007 are as follows.

Year	Take-Home Pay
1993	\$17,000
2007	\$113,200

If the CPI rose from 159 in 1993 to 215 in 2007 (1982–84 = 100), what was the "real" take-home pay of the employee in 2007?

- A) \$52,651
B) \$10,691
C) \$113,200
D) \$53,905
- 94) How is the purchasing power of the dollar computed?
- A) $(\$1/\text{CPI}) (100)$
B) $(\$1 - \text{CPI}) (100)$
C) $(\$1 \times \text{CPI}) (100)$
D) $(\text{CPI}/\$1) (100)$
- 95) If the Consumer Price Index in June 2006 was about 208 (1982–84 = 100), what was the purchasing power of the dollar?
- A) \$1.00
B) \$2.08
C) \$0.48
D) \$0.49
- 96) An index number is used to show the percent change from one period of time to another in terms of _____.
- A) value
B) price
C) quantity
D) All of these answers are correct.
- 97) How can indexes be classified?
- A) Price
B) Quantity
C) Value
D) Weighted or unweighted
- 98) The CPI for "personal computers and peripheral equipment" in June 2006 was 11.7 (1982–1984 = 100). Interpret this index.

- A) There was no significant increase in the price of "personal computers and peripheral equipment."
 - B) The price of "personal computers and peripheral equipment" increased 11.7%.
 - C) The price of "personal computers and peripheral equipment" decreased 88.3%.
 - D) If the average price of a computer in 1982–1984 was \$3,000, the CPI for "personal computers and peripheral equipment" would predict that the price of a computer in June 2006 would be \$883.
- 99) The CPI for "educational books and supplies" in June of 2006 was 386.7 (1982–1984 = 100). Interpret this index.
- A) There was no significant increase in the price of "educational books and supplies."
 - B) The price of "educational books and supplies" increased 386.7 times.
 - C) If the average price of a textbook in 1982–1984 was \$25.00, the CPI for "educational books and supplies" would predict that the price of the textbook in June 2006 would be \$71.68.
 - D) If the average price of a textbook in 1982–1984 was \$25.00, the CPI for "educational books and supplies" would predict that the price of the textbook in June 2006 would be \$96.68.
- 100) What does a typical market basket of goods and services include?
- A) Bread
 - B) Meat
 - C) Milk
 - D) All of these answers are correct.

Chapter 18

- 101) A three-period simple moving average is calculated by _____.
- A) using the actual value from three periods prior to forecast the next period
 - B) using the average of the three most recent periods to forecast the next period
 - C) using a smoothing constant to forecast the three most recent periods
 - D) using regression analysis in three-period increments to develop an average forecast
- 102) The following linear trend equation was developed for annual sales (in thousand \$) from 2015 to 2019, with 2015 as the base year: $\text{Sales} = 550 + 60(\text{time period})$. What are the estimated sales for 2025 (in thousand \$)?
- A) \$550
 - B) \$860
 - C) \$1,150
 - D) \$1,210

- 103) The following linear trend equation was developed for the annual sales (in million \$) of the Jordan Manufacturing Company. $\text{Sales} = 550 + 60(\text{time period})$. At what rate are sales increasing?
- A) \$60,000,000 per year
 - B) \$55 per month
 - C) \$5,500,000 per year
 - D) \$600,000 per month
- 104) If the least squares equation for sales data (in million \$) going from 2014 to 2018 is $\text{Sales} = 11 + 1.3(\text{time period})$, what is the time period and the forecast for 2022, respectively?
- A) 6; \$17.8 million
 - B) 9; \$22.7 million
 - C) 7; \$20.1 million
 - D) 8; \$21.4 million
- 105) What is α in exponential smoothing?
- A) The intercept
 - B) The forecast weight
 - C) The average forecast
 - D) The time period
- 106) Forecast error for three time periods was -28 , $+17$, and -3 . What is the MAD?
- A) -14
 - B) -4.667
 - C) 14.33
 - D) 16
- 107) If exports (in million \$) for the period 2006 through 2010 were \$878, \$892, \$864, \$870, and \$912, respectively, what are these values called?
- A) Moving averages
 - B) Linear trend equation values
 - C) Exponentially smoothed forecasts
 - D) Time-series data
- 108) Sara Jenkins notices that sales of several items that her company manufactures have shown a stable increase over the past few years, regardless of the time of year or state of the economy. What is this pattern for sales of those items over time called?
- A) A trend
 - B) Seasonal variation
 - C) Cyclical variation
 - D) Irregular component
- 109) A time series is a collection of data that _____.

- A) records past performance
- B) records future performance
- C) is limited to yearly data
- D) is limited to quarterly data

110) What is the difference between the actual and forecasted values of a time series called?

- A) Mean absolute deviation
- B) Trend
- C) Forecast error
- D) Irregular component

111) The following table shows actual and forecasted values for sales over time.

Year	Actual Sales	Forecasted Sales
2014	435	478
2015	475	469
2016	460	484
2017	495	513
2018	525	541

Calculate the MAD for this period.

- A) -95
- B) 21.4
- C) 19
- D) -19

112) Sam developed two different forecasts for gasoline prices, with one using a three-period moving average and the other using exponential smoothing. The MAD for the moving average forecast was 24, while the MAD for the exponential smoothing forecast was 12. Which forecasting method is better?

- A) Exponential smoothing is the preferred method because its MAD is smaller.
- B) The moving average forecast is the preferred method because its MAD is larger.
- C) As both MAD values are greater than 10, another forecasting method should be used.
- D) No conclusion can be reached.

113) The following table shows the number of digital video recorders sold each month at an online electronics store. Using a smoothing constant of 0.2, what is the forecast for July? Round any partial answer to the nearest whole number.

Month	Actual Sales
April	380
May	360
June	391
July	413
August	385

- A) 474
- B) 379
- C) 394
- D) 420

- 114) The following table shows the actual number of external hard drives sold each month at an online electronics store as well as a forecast for this same period developed by an analyst last year. What is the MAD?

Month	Actual Sales	Forecast Sales
January	482	435
February	431	371
March	460	528
April	571	635
May	581	563
June	529	552

- A) -5
- B) -3.667
- C) 46.67
- D) 53

- 115) For a time series beginning with 2010 and extending up to 2021, which year would be time period 1?

- A) 2021
- B) 2011
- C) 2010
- D) 2012

- 116) Oil prices were \$77.23 in January, \$68.89 in February, \$62.29 in March, and \$68.42 in April. What is the forecast for May using a two-period moving average?

- A) \$65.36
- B) \$63.01
- C) \$65.59
- D) \$64.99

- 117) Given the trend equation, $\text{Sales} = 29 + 0.9(\text{time period})$, what would be the forecast value for 2020? Assume a base period of 2016.

- A) 25.5
- B) 28.0
- C) 30.0
- D) 33.5

118) How can you describe the moving average method?

- A) A method that smooths out a time series
- B) A method to seasonally adjust a forecast
- C) A technique that results in a trend-line equation
- D) A method for computing the slope of a trend line

119) Oil prices were \$75.33 in January, \$70.78 in February, \$62.29 in March, and \$56.39 in April. What is the forecast for May using a three-period moving average?

- A) \$66.20
- B) \$68.78
- C) \$64.93
- D) \$63.15

120) A linear trend equation is used to represent time-series values when the data are changing by equal _____.

- A) percents
- B) proportions
- C) amounts
- D) both percents and proportion