



University of South Australia

If you are required to use a calculator, please note the make and model here:

Calculator Make:

Calculator Model:

2005 End of Year 2005 Examination

Student ID Number

Student ID Number

Family Name	
Given Names	

Division of Information Technology, Engineering and Environment

School of Natural & Built Environments

Course Name: Applied Research and Evaluation

Subject Area: ENVT

Catalogue Number: 2006

Examination Day: Thursday

Examination Date: 17/11/2005

Examination Time: 1830

Length of Exam: 2 hours

Examination Venue:

Ridley Centre

Instructions to Candidates

General Instructions

- 1) **This exam contains two papers. The first for students of Biodiversity and Environmental Management, the second for students of Recreation Management. Please open to the correct paper, each are clearly marked.**
- 2) Attempt all questions. Circle multiple choice answers against each question and submit the question paper along with the answer book.
- 3) Marks for each question are indicated in each section of your respective paper
- 4) Ensure that you have filled in your details on both the answer booklet and on this question paper where indicated.

Additional Instructions

- 1) Read the question paper carefully
- 2) Clearly state any assumptions made
- 3) Use examples and diagrams where appropriate, in answering the questions
- 4) Start a new question on a new page in the answer book
- 5) Write clearly the question number at the top left margin on each page
- 6) Use both sides of the paper in the answer book

Conduct in examinations

Examination procedures

- Students will be allowed a designated reading time prior to the published starting time for the examination.
- No writing in the examination booklets is permitted during the reading time. However, during this period students may complete attendance slips, make notes on loose-leaf paper provided, and fill in details required on the front cover of examination booklets.
- Every student shall fill in the attendance slip where provided. Students will display their student identification card, or an alternative form of photographic identification acceptable to the invigilator. Students who are unable to provide such proof of identity will be permitted to proceed with the examination but will be required subsequently to provide proof of identity. Students holding an ENTEXT card or Access Plan should display the ENTEXT card or Access Plan in addition to their identification card.
- No student shall commence writing answers until authorised by the chief invigilator. All students shall cease writing when instructed by the chief invigilator. At the conclusion of the examination all students shall remain seated until all examination booklets have been collected.
- No student will be permitted to enter the examination room more than 30 minutes after the published starting time.
- No student shall leave the examination room before 30 minutes have elapsed from the published starting time or during the last 30 minutes of any examination.
- After the published starting time a student may leave the examination room temporarily only with the consent of the chief invigilator, and shall be adequately supervised during this period.
- Any student who wishes to leave the examination room, except temporarily, must hand to the invigilator all examination booklets. The invigilator must endorse the booklets as correctly identifying the student.
- A student must not take into the examination room any books, dictionaries, calculators, mobile telephones, personal digital assistants, notes, or other documents, devices or personal items except those specified in the Course Information Booklet (see clause 5.4 c) and authorised by the examiner.
- During an examination no student shall speak to or communicate with any other student.
- During the examination no student will give to or receive from any other person any form of assistance, academic or otherwise.
- No student shall bring into, or remove from, an examination room any examination answer booklet or examination attendance slip.
- Where a student is disrupting the examination, the student may be summarily dismissed from the examination room at the discretion of the chief invigilator.
- Exceptions to the above procedures may be made only with the prior approval of the Director: Student and Academic Services.

Breaches of examination procedures

- Any student who breaches these examination procedures will be guilty of misconduct.
- If misconduct is detected, the invigilator will inform the student at the completion of the examination that the misconduct will be reported.
- The invigilator will document the incident using the Incident Report proforma, and will provide a copy of this report to the Head of School/Dean: Whyalla responsible for the course, within 5 working days of the incident. The Head of School/Dean: Whyalla will investigate the incident.
- Where the Head of School/Dean: Whyalla concludes that no misconduct was involved, no further action will be taken and no record of the investigation will be placed in the student's file.
- Where the Head of School/Dean: Whyalla concludes that the action of the student was an example of inadvertent misconduct, the student will be counselled by the Head of School/Dean: Whyalla, and a note to that effect will be placed in the student's file.
- Where the Head of School/Dean: Whyalla concludes that the action of the student constitutes deliberate misconduct, the Head of School/Dean: Whyalla may determine that the appropriate penalty is the first penalty specified in clause 9.28 below.
If the Head of School/Dean: Whyalla makes such determination and if the student admits to misconduct and agrees to imposition of the first penalty specified in clause 9.28 then:
 - a the Head of School/Dean: Whyalla will prepare a written statement using the proforma ([Investigation Report](#) - PDF staff access only) setting out the findings on the facts, referring to the evidence or other material on which the findings were based, noting the student's admission of misconduct and setting out the penalty imposed, the reasons for its imposition, and the student's agreement to its imposition.
 - b the Head of School/Dean: Whyalla will, within 10 working days, provide a copy of the Investigation Report to the student, the relevant Pro Vice Chancellor, the Head of School/Dean: Whyalla, the Division Manager and the Director: Student and Academic Services; and
 - c a copy of the Investigation Report will be retained in the student's file and the Head of School/Dean: Whyalla will issue a reprimand to the student.
- Where the Head of School/Dean: Whyalla concludes that the case involves deliberate misconduct and either:
 - a the student does not admit to misconduct; or
 - b the student does not agree to accept the first penalty prescribed in clause 9.28 below; or
 - c the Head of School/Dean: Whyalla or the student believes that the first penalty prescribed in clause 9.28 below is not appropriate; then the Head of School/Dean: Whyalla shall establish a formal inquiry.

University of South Australia
School of Natural and Built Environments

Applied Research and Evaluation

Biodiversity and Environmental Management
STUDENTS EXAM

Thursday 17th November

Section A

Circle the correct answer for each of the following questions 30 marks

Qu1. Data analysis is:

- a. the processing and interpretation of a given set of information or observations
- b. the processing of only attribute data
- c. the interpretation of only spatial data
- d. the derivation of only a summary statistic

Qu2. Analysis involves collection of data and the manipulation, enhancement and extraction of information and ultimately ideas based on this information. A conceptual idea for the understanding of these processes is termed:

- a. the data square
- b. the information pyramid
- c. the triangle of reason
- d. the dodecahedron of understanding

Qu3. The scales of measurement are:

- a. nominal, ordinal, ratio, interval
- b. normal, ordered, related, internal
- c. nominal, ordinal and logarithmic only
- d. not used in data analysis

Qu4. The order of increasing mathematical ability for the scales of measurement is:

- a. nominal, ratio, interval, ordinal
- b. ordinal, normal, ratio, interval
- c. nominal, ratio, interval, ordered
- d. ratio, interval, ordinal, nominal
- e. nominal, ordinal, interval, ratio

Qu5. Data is broadly defined into primary and secondary sources of data. Secondary methods may include:

- a. maps and questionnaires
- b. maps and statistical records
- c. survey questionnaires and measurements of observations
- d. digital transfer, maps, statistical records and measurements from experiments

Qu6. When one analyses data the first procedures of analysis should be:

- a. inferential statistical analysis
- b. inferential statistical analysis followed by confirmatory statistical analysis
- c. define the descriptive statistics
- d. draw of histogram to assist in the visualisation of descriptive statistics

Qu7. The normal distribution assumes the data sample is:

- a. non-Gaussian in nature
- b. a symmetrical 'bell-shaped' curve
- c. an asymmetrical 'bell-shaped' curve
- d. is not representative of the population

Qu8. An 'ideal' normal distribution shows the mean and the median:

- a. to be separated
- b. located at the same position
- c. to be separated by one standard deviation
- d. are not found with an ideal normal distribution

Qu9. The z-score:

- a. assists at calculating the mean
- b. defining the standard deviation of a distribution
- c. is always a value less than the mean
- d. is always a value greater than the mean
- e. is equivalent to the sample mean when equal to zero

Qu10. A box-plot is:

- a. a diagram that shows the percentiles of a data distribution
- b. the mean and standard deviation of a data distribution
- c. only 50 % of the data distribution
- d. only extreme values and outliers of a data distribution

Qu11. The coefficient of determination is known as:

- a. r^2
- b. r
- c. t
- d. σ
- e. μ

Qu12. The Spearman correlation coefficient is:

- a. used for parametric data
- b. used with distribution-free data
- c. is only another name for the Pearson product-moment coefficient
- d. is only used when a linear regression model is produced

Qu. 13. The probabilities (significance levels) of the chi-square and t-test for a sample use degrees of freedom which are determined by:

- a. $n-1$
- b. $n+1$
- c. n
- d. $n-2$
- e. $N-1$

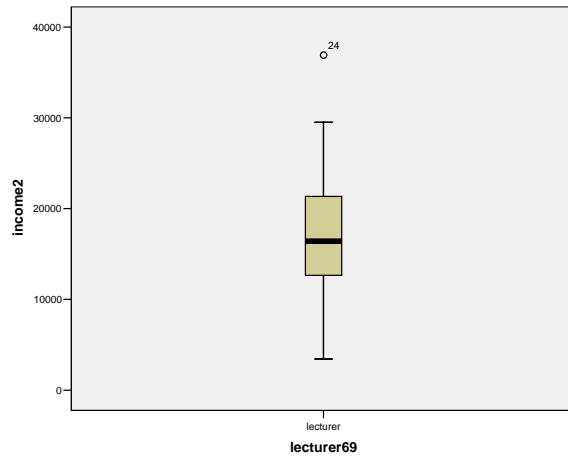
Qu14. If $r^2 = 0.78$, the per cent of total variance explained by the correlation between the two variables is:

- a. 7.8 %
- b. 100%
- c. 0.78%
- d. 00.78%
- e. 78%

Qu15. If $r^2 = 0.78$, the per cent of total variance that is unexplained by the correlation between the two variables is:

- a. 92.2%
- b. 0%
- c. 99.22%
- d. 22%

Qu16. The following plot is known as a:



- a. cumulative histogram
- b. box-plot
- c. a histogram for directional data
- d. cat and whiskers plot

Qu17. The Wilcoxon signed ranks tests the determination of a test-statistic uses only:

- a. interval data
- b. ordinal data
- c. logarithmic data
- d. nominal data
- e. ratio data

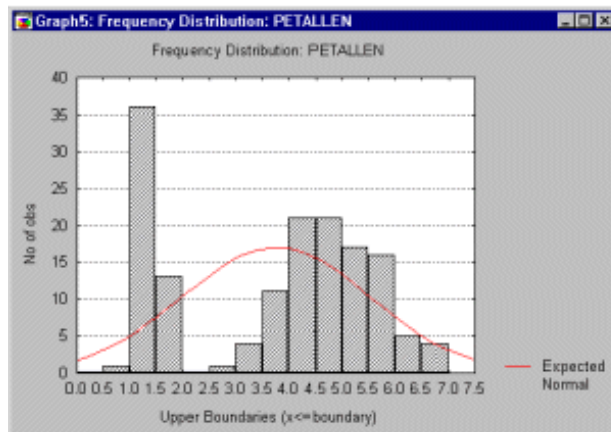
Qu18. The skewness of a data distribution tells us about:

- a. the flatness of a distribution
- b. the peakedness of a distribution
- c. the 'tails' of the distribution
- d. the value of highest frequency for the distribution

Qu19. Significance levels for test statistics are usually tested at the interval:

- a. 0.00
- b. 0.02
- c. 0.5
- d. 0.005
- e. 0.05

Qu20. The following diagram shows:



- a single normal distribution
- a single leptokurtic distribution
- a bimodal distribution
- a negatively skewed distribution

Qu21. Measures of central tendency include the:

- mean, median and variance
- median, mode and skewness
- mode, median, mean, skewness, kurtosis
- skewness, kurtosis
- median, mode, mean

Qu22. When constructing a histogram of data in SPSS, bin or class size is:

- irrelevant to how the graphic appears
- ideally represented with 10-bins
- ideally represented with 100-bins
- never changed from the default of SPSS
- is adjusted by the analyst to suit the data

Qu23. A statistical sample is:

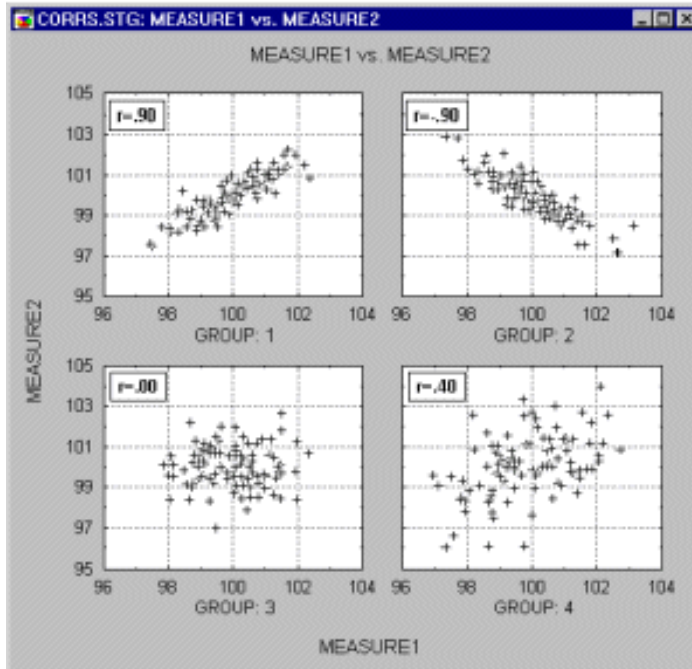
- identical to the population
- ideally a portion of a population that is representative of the population
- equivalent to a test statistic, such as t or r
- not representative of a population, you must sample an entire population for statistical testing to proceed

Qu24. A linear regression model can be derived:

- at all times when making inferences about data
- when the Spearman correlation coefficient shows a strong bivariate relationship
- when the Pearson correlation coefficient shows a strong bivariate relationship
- when the assumptions of data normality and dependence are met

Qu.25 Data Group 1 of the following diagrams shows:

- a. a strong negative relationship
- b. no relationship
- c. a slight positive relationship
- d. a strong positive relationship



Qu26. A statistical sample is represented by the term:

- a. μ
- b. χ
- c. σ
- d. n

Q27. A statistical population is represented by the term:

- a. Z
- b. N
- c. n
- d. μ

Qu28. A correlation coefficient of 1.0 will show all data as:

- a. a line
- b. a circle
- c. an ellipse
- d. a triangle

Qu29. A data model:

- a. is always linear
- b. is always curvilinear
- c. is always positive
- d. can be cyclical

Qu.30. Data that is categorised as nominal can:

- a. be modelled using linear regression
 - b. use Boolean operators
 - c. use arithmetic operators
 - d. cannot be manipulated mathematically in a meaningful way
-

Section B Short Answers Questions

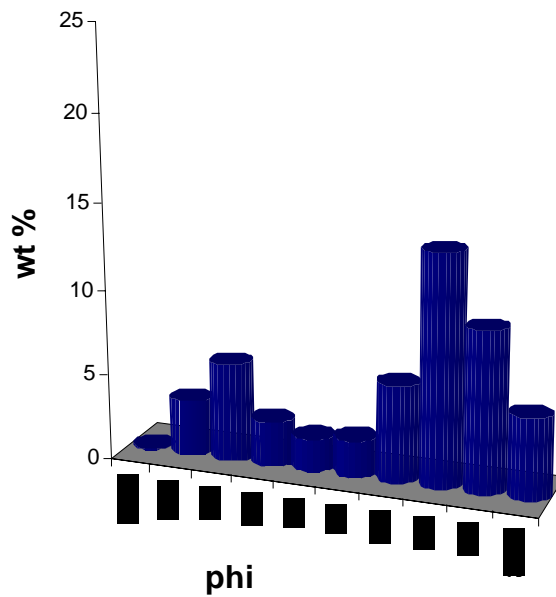
60 marks

Answer ONLY Three (3) of the following questions. You have a choice between questions #3 and #4.

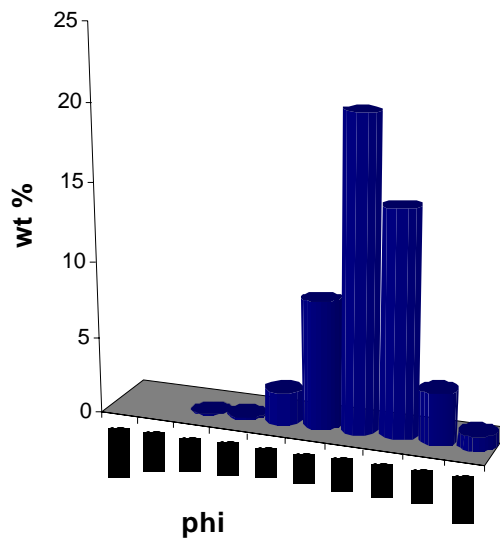
Qu1.

Using visual interpretation of the following histograms discuss in descriptive statistical terms the characteristics of each distribution.

interdune



dune stoss



Qu2.

Data analysis involves both exploratory and confirmatory techniques. You have measured a set of observations for tree canopy width and trunk height for red-gum eucalypts along the River Murray. The data set has, $n = 614$ and the distribution can be assumed Gaussian. A test was conducted which gave an r^2 value of 0.87.

- a. Explain whether a confirmatory style of analysis is applicable or not, for this data
- b. What type of association should exist between bi-variables (x & y) if statistical models are to be constructed?
- c. What inferential statistical techniques, if any, have already been used on this data? Explain.
- d. What is the type of relationship (model) that exists for this data?
- e. What was the per cent of total variance unexplained for this data?
- f. Discuss what the explained and unexplained variance indicates about the relationship for this data
- g. What other non-attribute variables may assist in further developing any model inferred from this data?
- h. If the population was later found to be non-Gaussian, what inferential test would be most appropriate to describe a relationship for this data?

Qu3.

From the following scenario, describe the components relevant to each layer of the information pyramid.

Scenario

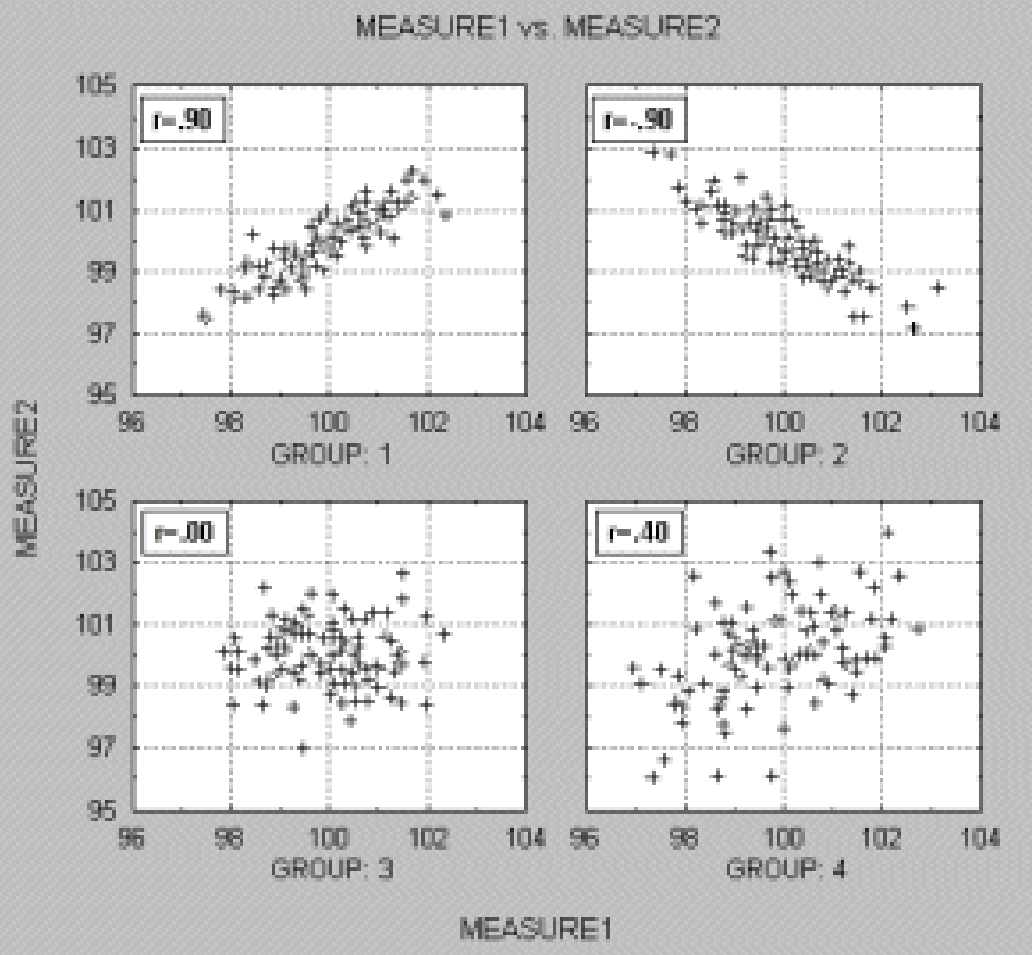
High winds and rain often lash the metropolitan region during the cold and wet winter months, resulting in damage to buildings and property, such as fallen trees, overflowing gutters etc. There is a 'risk' factor which varies across the metropolitan region and is dependent on the level of exposure to wind and rain. Being able to predict such 'risk' will assist in deciding where to prioritise the resources and funding for emergency services and community support.

OR

Qu4.

For each of the following diagrams draw a 'line-of-best-fit' for the relationships.

- a. Describe what such lines demonstrate about the data.
- b. Discuss the process of linear regression modelling of data. Your answer should include comment on:
 - I. sample size
 - II. type of data (scales of measurement)
 - III. assumptions about the data distribution
 - IV. the relationships between variables



University of South Australia
School of Management

Applied Research and Evaluation

RECREATION STUDENTS EXAM

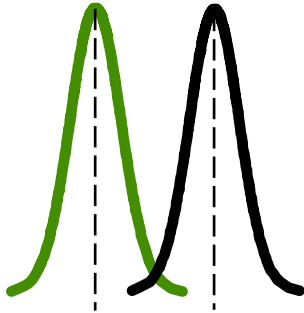
Thursday 17th November

Section 1.

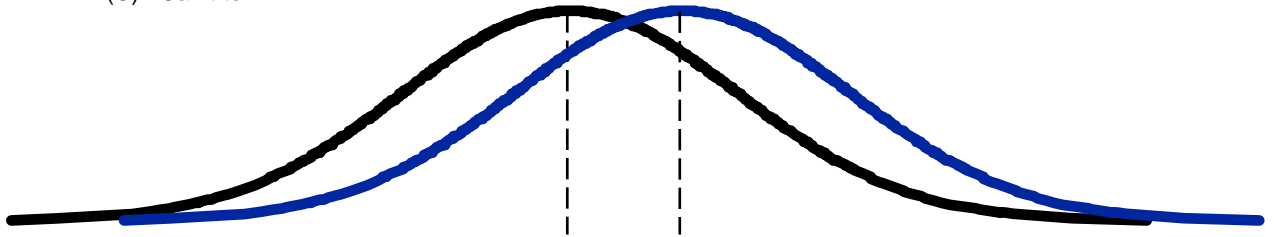
Answer the following questions. Multiple guess questions for starters:

1. The correlation coefficient is represented by what letter, and ranges from;
(A) N, 0 to 1
(B) r, 0 to 1
(C) N, -1 to 1
(D) r, -1 to 1
2. Chi-square is used when we are interested in testing whether a significant difference exists in,
(A) Means
(B) The numbers or amount of things
(C) Two groups
(D) More than two groups
3. The correlation coefficient is used when you are looking at,
(A) relationships between variables
(B) differences between variables
(C) differences in more than two groups
(D) nominal or ordinal data
4. The T-test is used when we are interested in testing whether a significant difference exists in,
(A) Variances
(B) The numbers or amount of things
(C) Two groups
(D) More than two groups
5. When we want to calculate whether a difference in the mean of something varies between more than two groups, we use:
(A) T test
(B) Chi square
(C) ANOVA
(D) Regression
6. A sample has a mean of 50 and standard deviation of 10. What is the probability that a sample value will be found between 40 and 60?
(A) 50%
(B) 67%
(C) 95%
(D) 99%
7. Which of the following is NOT a measure of central tendency
(A) Mode
(B) Standard Deviation
(C) Median
(D) Mean
8. Probability sampling requires that each element in a population have a _____ probability of being selected.
(A) known
(B) equal
(C) separate
(D) common
9. Which form of sampling usually generates its sample using something like a random number table?
(A) simple random
(B) stratified
(C) systematic
(D) cluster

10. Examine the graph below depicting the distribution of Self Esteem scores for men and women. Do you think this would suggest a significant difference between the groups?
- (A) Yes
 - (B) No
 - (C) Can't tell



11. Examine the graph below depicting the distribution of BMI scores for men and women. Do you think this would suggest a significant difference between the groups?
- (A) Yes
 - (B) No
 - (C) Can't tell



12. For a t-test, how are the degrees of freedom calculated?
- (A) N
 - (B) N-1
 - (C) N-2
 - (D) N+2
13. What is the general confidence limit that is set for most statistical analysis?
- (A) 0.01
 - (B) 0.10
 - (C) 0.5
 - (D) 0.05

Below are statistical results analyzing the gender and a range of issues associated with Body Mass Index, Self Esteem, Social Physique Anxiety (SPA) and Body Dissatisfaction.

Researchers were concerned about possible barriers to participation for women. It had been showed that women, generally, encountered more barriers to their participation than men. Surveying 180 people (male= 100, female = 80), researchers investigated whether or not there was a gender difference based on SPA. SPA was measured on a 12 item five point scale. Each item was added together to form a cumulative total. The higher the total, the higher the level of SPA. They found the following results:

Mean for SPA for Men = 36.84
Mean for SPA for Men = 41.62

A t-test was conducted to see if this difference was significant. The following figures were obtained:

t=3.45; df=178; p=0.001

14. Based on the statistical analysis, is there a statistically significant difference between men and women in their level of SPA?

- (A) YES
- (B) NO
- (C) Can't Tell

15. What is the p-value indicating in the above test?

- (A) The difference is significant
- (B) The difference is not significant
- (C) Neither, it cannot be calculated

Researchers then wanted to assess the relationship that may exist between Self esteem and Body Mass Index . Self esteem was measured on Rosenberg's Self Esteem Scale, a scale of 10 items measured on a five point scale. Higher scores indicated higher self esteem. BMI is a well known measure of body mass and size – under 20 indicates underweight, 20-25 normal weight, 25-30 overweight and over 30 is obese.

The following figures were obtained.

$r=0.79$
 $r^2 = 0.62$

16. How was this relationship calculated? What test did the researchers use?

- (A) T-test
- (B) ANOVA
- (C) Correlation

17. What was the result of the test? Is there a relationship between the two variables?

- (A) YES
- (B) NO
- (C) Can't Tell

18. Describe the nature of the relationship, if any.

19. What does the r^2 figure of 0.62 indicates to researchers?

20. What is this figure referred to as?

Section 2

1. When would you use a paired samples t-test? Give an example. Give an example of when you would use an independent samples t-test. What is the difference between the two tests?

2. In statistical testing, what do we need to obtain to show that something (for example, the mean of something for one group) is significantly different from another?

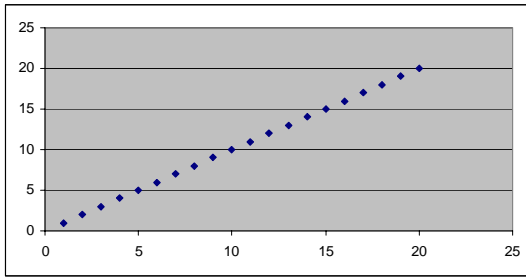
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3. Outline the two main groups of inferential statistical analyses. Provide an example of a test for each

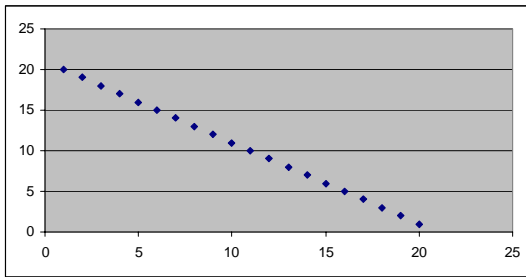
4. Why can you not conduct a t-test on two nominal variables,(for example, the difference in car colour preference based on gender)?

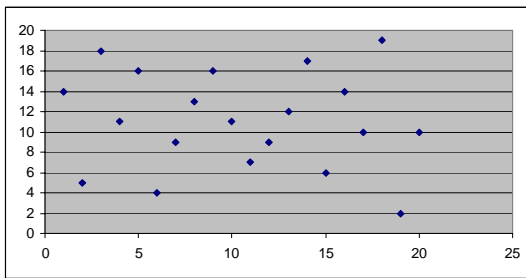
5. Write a single item to measure how satisfied people are in their leisure. Make the level of measurement interval

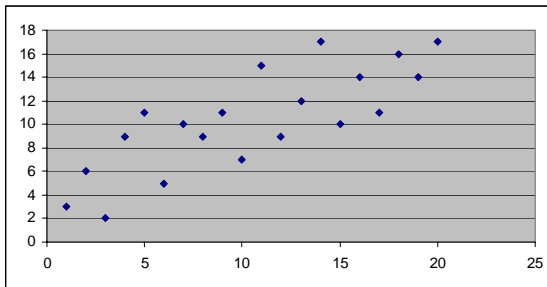
6. Write a single item to measure how satisfied people are in their leisure. Make the level of measurement nominal

7. Give an approximate estimate of the correlation co-efficient for the following scatterplots









8. Describe the relationships with the following correlation coefficients:

+0.45 -

0 -

-0.73 -

+0.89 -

+1.02 -

9. Explain when you would use a one-tailed test and when you would use a two tailed test?

10. What is the probability (from 0 to 1) of the following occurring

- Throwing a head when tossing a coin -
- Throwing a head OR a tail when tossing a coin -
- Drawing a card from a normal deck and getting a Diamond -
- Rolling a 1 or a 2 on a 6 sided dice -
- Drawing a Queen from a deck of cards -

Section 3:

This section requires deeper thinking than the first two sections, and is intended to assess your understanding of how the research issues you have covered are not distinct, but inter-relate to provide a complete picture of "research".

1. Consider the following scenario and answer the questions below:

A researcher is interested in investigating whether older adults are less regular in their participation in active recreation than younger adults. He devises a survey to measure the regularity of participation in active recreation in three ways:

- whether or not they are regular participants,
- the frequency of their participation (how many times per week they participate) and,
- the intensity of their participation (what proportion of the active recreation raises a sweat and shortness of breath – all, half or none)
- their satisfaction with their participation on a scale from 1 (very dissatisfied) to 5 (very satisfied).

He administers this survey to a group of people (N = 184), and divides the group into two categories; older adults (50 years of age +) and younger adults (less than 50 years of age).

(A) What test would he need to conduct to see if older adults were significantly lower in their level of satisfaction with active recreation than younger adults?

(B) Would the test described in A be a one or two tailed test? Why?

(C) What test would he need to conduct to see if younger adults participated at a significantly higher level of intensity than older adults?

2. Four specific errors or mistakes in the research process or interpretation exist in the following scenario. Identify them in the space provided below. Each error or mistake is considered as separate, so they are not expected to logically follow on from each other.

A group of researchers are investigating whether socio-economic status has an effect on the types of activities (eg, soccer, walking, tennis, swimming etc) participated in during active recreation.

They conducted a face-to-face survey of people in two suburbs, one defined as lower socio-economic and one as higher socio-economic. In the survey they asked questions on the types of activities that were participated in during active recreation. To ensure representativeness, the survey was conducted during weekdays (Monday to Friday) between 9,00 and 3.00.

Once the data was collected (N=185), the researchers investigated whether there was a significant difference in the type of activities participated in based on socio-economic status. The researchers obtained mean and standard deviation for types of activities and to test whether there was a significant difference in the type of activities participated in based on socio-economic status, a t-test was conducted. The following results were obtained ($t=4.7$; $df = 183$; $p=.034$). Examining these results, the researchers concluded there was no significant difference in the type of activities participated in based on socio-economic status.

Identify the four errors:

- -----
3. Consider the following test figures and give your decision (i.e. whether the test identifies a significant difference or not).

(t = 2.034, df = 145, p < .05) -----

(t = 0.415, df = 298, p = 0.45) -----

(t = 1.534, df = 135, p = .055) -----

(Chi-square = 7.78, df = 3, p=.005) -----

(Chi-square = 1.94, df = 2, p=.12) -----

(Chi-square = 1.94, df = 2, p=>.05) -----
