MCQ:

1. D- Interpretation
2. A - Internal: Whether the research design and evidence allows us to demonstrate a clear cause and effect relationship
3. C - 0.5
4. A - A perfect relationship
5. D - Falsification
6. D - Z-score
7. C - 81.5%
8. C - Double-blind procedures
9. B - Eliminate artifacts
10. B - The null hypothesis is incorrectly rejected when it is true
11. A - The conclusion is a false positive
12. D - All of these are correct
13. B - Hypothesis > Test > Analyze and conclude > Update or discard > Theory
14. B - A: Longitudinal, B: Cross-Sectional
15. C - Central tendency measures always accurately describe the shape of distribution
16. C - 55% of the cohort got a mark higher than 34
17. B - It can be used for all measurement scales
18. D - -0.89
19. A - First do no harm
20. A - Information from tenacity
21. B - Mean, median, mode
22. C - Evaluates mean difference between two treatment conditions using data from a single sample
23. C - How to operationalise independent variables
24. A - It is usually good for external validity
25. C - The distance between the scores is not specified, as equal differences in percentiles do not reflect equal differences in actual scores
26. B - It falls under parsimony
27. D - $38
28. C - 0.30
29. A - They are high in internal validity and low in external validity
30. D - Predictive: Compares the scores on two current measures to determine whether they are consistent
31. C - Spurious correlation
32. B - Nominal
33. A - If H_0 is true
34. A - Quantifying empirically the definition of variables
35. B - Median Split
36. B - Run in either two directions and leads to rejection of null hypothesis
37. B - Increased detection of treatment effect

38. A - It was considered as a natural variable
39. D - Larger, larger
40. A - A ‘rule of thumb’ for estimating probabilities based on the ease with which occurrences can be brought to mind
41. A - 0; 1
42. C - Test-retest ability
43. C - Test-retest: the inconsistency of measurement across singular sessions of testing
44. A - When population mean is unknown
45. B - IV: Manipulated or controlled by experimenter, Quasi-IV: Cannot be randomly allocated, DV: Used to assess or measure the results/effects
46. A - 13; 12
47. B - Partial control of natural variables
48. D - In cases such as in learning/development, the study changes over time
49. C - Influences size of standard error in the denominator of a z-score
50. D - Space effects

SHORT ANSWERS:

RESEARCH METHODS

1. The two assumptions of science are **hard determinism:** human behaviour and actions are wholly explained by predetermined external factors, and **scientific determinism:** there is some underlying systematic order to many phenomena in the universe.
2. Pseudoscience uses scientific methodology and techniques but they are not applied correctly.
   Most pseudoscience does NOT use the scientific method. It also does not change when sufficient evidence suggests that the prediction or theory is wrong.
3. Independent = “Type of suggestion about messages given to participants” eg no suggestion/word suggestion/satanic suggestion
   ; Dependent = “The percentage of participants hearing Satanic related words” eg participants responses were recorded to see if they wrote any satanic words
4. It involves the reliability of results across experiments AND it is critical to the scientific method
5. Reliability - Inter-observer/ Internal or Split-Half/ Test-Retest; Validity - Internal/ External(Population + Ecological)/Measurement(Construct+Content)/ Criterion (Concurrent + Predictive)
6. Confounds are a third variable that differs between the groups and is a major threat to internal validity. Artifacts are variables that are ever-present in all groups being tested and reduce external validity.
7. Strength of cross-sectional: relatively inexpensive and less time consuming, low attrition rate; Weakness of cross-sectional: cannot observe changes in individuals, insensitive to abrupt changes, age-cohort effects / Strength of longitudinal: genuine changes and stability of observed characteristic, major points of change observed; Weakness of longitudinal: time consuming and expensive, participant attrition - threat to validity
8. Survey disadvantage - limited data from a large sample;
   Survey advantage - quick and efficient, very large sample, simple to use, easy to obtain an opinion / UNSW Students is a disadvantage- WEIRD population - biased sample as data is only collected from uni students. This means it is not suitable to generalise the results to the wider population
9. Selection bias is where participants volunteer for a study who have a biased interest in the topic of research or the outcome of the study. Selection bias can be minimised by using a random sample of the population. Whilst this does not fully eliminate all problems, it reduces the likelihood of systematic biases in data.
10. An attribute variable measures individual differences and most commonly is used for comparing groups. An example would be extroversion vs introversion as an attribute variable which measures personality traits. A natural variable is manipulated by nature. For example, being in a hurricane, war zone, biological differences (gender, age) or the country of birth.

11. Improvement to be made: Random assignment of psychoanalyst to either normal or abnormal groups Why?: Because the groups were not randomly assigned, any difference observed between the groups might be due to characteristics of the people in the different groups (i.e. the psychoanalysts from the publicly funded vs privately funded hospital). Random assignment controls bias in group allocation by minimising confounds and ensuring internal validity.
12. Scientific misconduct refers to intentionally fabricating and falsifying academic and scientific findings, data and conclusions. The four types of scientific misconduct include plagiarism, conflict of interest, fabrication and falsification.
13. The three Rs of animal research ethics include: Replacement of animals by other research methods, Reduction in the number of animals used by means of more advanced statistical techniques, Refinement of experimental procedures to reduce animal suffering

STATISTICS

1. 50% of the marks sit below the mean of 70 marks. 84-50= 34 → the 84th percentile is 34% of the marks above the mean. This is 1 standard deviation away from the mean (because 34x2=68, look at the normal distribution curve) Therefore, the score that would put you in the 84th percentile is 1 standard deviation away from 70 and since the standard deviation is 5 the answer is 75.
2. A nominal scale is used for categorical items that are not continuous variables and when numbers are used they do not indicate size or order, only sameness or difference. An example is asking a question about gender. Interval scales allow for the separation of objects into mutually exclusive categories, arranged in a specific order and with a specific distance between the data points. An example is temperature ratios (e.g. 15-20 degrees celsius, 20-25 degrees celsius, etc.)
3. A positively skewed distribution has more of the data around the lower end of the scale with outliers obtaining higher scores. The mean will be higher than 8 because the high score outliers will impact the mean. The mode will be lower because it depends on the exact centre of the scores and not the outliers.
4. Discrete data are composed of indivisible units that are represented by a whole number such as the number of children one has. Continuous data involve numbers which can be divided an infinite number of times, such as one's height.
5. The mean of the data set would remain 30 and the standard deviation would increase by 2 (from 2 to 4). The distributions would be spread around the same mean of 30 but the second data set would have a wider curve.
6. Type II errors are when we fail to reject the null hypothesis or in other words, there is an effect, but our experiment does not detect it. Incorrectly accept a Making a Type II error is preferable when the costs outweigh the potential benefits. For example, if there was a drug with serious side-effects, it would be better to increase the probability of not using a drug until we are sure that there is an effect.

7. The α-value is the criteria that the p-value must be smaller than to reject the null hypothesis. In other words, the p-value represents the risk that the null hypothesis is true given the results and alpha is the maximum level of risk we will accept.
8. Look at distance travelled to class (km or any identifying measure) & lateness to class (mins or any identifying measure)
9. If 7 students in a class of 25 scored above 70%, then those 7 students make up 28% of the class. That leaves 72% of students with a score below 70%. Since your friend achieved a score higher than 72% of students, they are in the 72nd percentile.
10. Independent measures design characterised by two populations with two distinct samples (Chinese school children & Aussie school children)
11. The mean screen size is $17.8cm^2$ as it lies directly in the middle of the lower bound of $16.8cm^2$ and upper bound of $18.8cm^2$. Since 95% represents the proportion of phones with screen sizes that lie 2 standard deviations above and below the mean, then the standard deviation must be a quarter of the area between 16.8 and 18.8 cm^2. Hence, the standard deviation is $0.5cm^2$.
12. H0: $\mu = 17.8cm^2$, H1: $\mu > 17.8cm^2$
13. We need to know whether a) the observations within samples are independent, b) if the population distribution is normal and c) if it the population distributions have equal variance.