Statistics Revision topic list

Mathsgenie and Stats Academy both have some excellent materials to support your GCSE Statistics revision. There are exam questions sorted by topic, videos and lots of past papers.

Here's a set of revision notes that you might also find useful when reviewing topics but remember that to revise Statistics, you need to do Statistics:

Here is a full list of topics for Statistics:

Unit 1 - The collection of data

- Use correct terminology to describe different types of data and know the differences between them (primary, secondary, quantitative, qualitative, discrete, continuous, categorical, ordinal, bivariate and multivariate)
- Know how to group rounded and unrounded data into class intervals or categories and the advantages and disadvantages of doing so.
- Understand population, census, National Census, sample and sample frame, and identify these for given data.
- **Use the Petersen capture–recapture formula to estimate the size of a population and know the assumptions made when using this method.**
- Know and be able to describe different methods of random and non-random sampling (including judgement, opportunity, cluster, systematic and quota) and understand the advantages / disadvantages of each.
- Select a sample stratified by one category and by more than one category.
- Know the key features to consider when planning interviews and questionnaires.
- Know how and why to clean data including outliers, or anomalous data values.
- Identify and control extraneous variables.
- Know the importance of controlling extraneous variables and **be able to describe and use control groups and matched pairs.**
- Write a hypothesis and decide on suitable data to collect to test it.
- Know the advantages of using a pilot survey.
- Design a data collection sheet, and collect data from different sources.
- **Use the random response method for sensitive questions.**

- Know possible constraints on an investigation and how to deal with difficulties such as non-response.
- Know potential problems with collected data and how to deal with them.
- **Understand and know when to use control groups and matched pairs.**

Unit 2: Processing, representing and analysing data

- Select the appropriate representation to use.
- Decide whether to group data into class intervals.
- Recognise well-presented and poorly presented data.
- Construct, draw, use and understand:
  - two-way tables
  - tally charts
  - pictograms
  - bar charts
  - vertical line graphs
  - stem and leaf diagrams
  - pie charts
  - population pyramids
  - choropleth maps
  - cumulative frequency graphs
  - histograms
  - frequency polygons
  - **comparative pie charts with area proportional to frequency**
  - **histograms with unequal class widths**
- Identify the shape of distributions of data including symmetry, positive and negative skew.

Unit 3: Summarising data: measures of central tendency and dispersion
- Calculate:
  - The mean, mode, median (including by interpolation) and range for a list of numbers and discrete and/or continuous data listed in a table
  - The minimum, lower quartile, median, upper quartile and maximum value for a list of numbers
  - The interquartile range, percentiles and the **interpercentile range** for a set of data.
  - The standard deviation for discrete and grouped data
  - The skewness by inspection **and calculation**
- Understand the advantages and disadvantages of each of the three measures of central tendency, and which is appropriate to use in different situations.
- Understand the effect of transformations on the mean, mode and median.

- **Calculate a geometric mean and weighted mean for a set of data.**
- Construct, use and interpret box plots from summary statistics and cumulative frequency graphs.
- Identify and interpret outliers by both inspection **and calculation** and show on a box plots.
- Use box plots as a method to compare sets of data for dispersion, measures of central tendency and skewness.
- Given the median and interquartile range, make comparisons between different data samples to compare the sample and population data.
- Identify simple properties of the shape of distributions of data including symmetry, positive and negative skew.

Unit 4: Scatter diagrams and correlation
- Draw a scatter diagram
- Know the difference between an explanatory (independent) and response (dependent) variable
- Recognise positive, negative and zero correlation as well as strong, moderate or weak correlation by inspection
- Understand the distinction between correlation and causality
- Draw a line of best fit through the mean point to the points on a scatter diagram and to find the equation of the regression line
- Understand the pitfalls of interpolation and extrapolation
- **Find the equation of a line of best fit**
- **Draw a regression line on a scatter diagram given the equation**
- Interpret the value of the gradient and y-intercept
- Interpret Spearman's rank correlation coefficient
- **Calculate and interpret Spearman's rank correlation coefficient**
- **Understand the difference between Spearman's rank and Pearson's product moment correlation coefficients**
- **Interpret Pearson's product moment correlation coefficient in context**

Unit 5: Time Series
- Draw and interpret line graphs and time series.
- Draw trend lines on time series graphs and use inspection to identify trends.
- Know that a trend line shows the general trend of data.
- Interpret rising, falling and level trends on a time series graph.
- Identify seasonal variation on a time series graph.

- Calculate moving averages and provide reasoning as to appropriateness
- Draw a trend line through moving averages by eye.
- **Calculate and describe the process to calculate the estimated mean seasonal variation.**
- **Know that the predicted value = trend line + mean seasonal variation**.

Unit 6: Probability
- Understand the meaning of the words impossible, certain, very likely, likely, unlikely, possible and evens
- Use fractions, decimals and percentages to represent probabilities
- Experimental probability - use probability values to calculate expected frequencies and compare them with actual frequencies
- Use probability to assess risk and be able to calculate absolute and relative risk
- Use sample space, venn and tree diagrams to represent the different outcomes possible for up to three events
- Understand the terms mutually exclusive and exhaustive
- Use the addition law P(A or B) = P(A) + P(B) for two mutually exclusive events
- **Use the general addition law for events that are not mutually exclusive.**
- Understand what it means for two events to be independent
- Use the multiplication laws for independent events
- Use a tree diagram to calculate probabilities
- Understand what it means for two events to be conditional
- Calculate conditional probability using a tree diagram, two-way table or Venn diagram
- Use the formula for conditional probability
- Know that for independent events A and B, P(A) = P(A|B)

Unit 7: Index numbers
- Calculate index numbers with use of a base year
- Interpret index numbers, including RPI and CPI
- Interpret GDP value (an economy is in recession if GDP falls in 2 or more successive quarters)
- Calculate rates of change over time including crude birth and death rates

- **Calculate standardised birth and death rates**
- **Calculate and interpret weighted index numbers**
- **Calculate chain base index numbers**

Unit 8: Probability distributions
- **Know the conditions for a binomial distribution to be a suitable model**
- **Understand the notation B(n,p)**
- **Calculate probabilities using a binomial distribution**
- **Know that the mean of a binomial distribution is np**
- **Know the conditions for a normal distribution to be a suitable model**
- **Understand the notation $N(\mu, \sigma^2)$**
- **Know the shape of a normal distribution and how this occurs (including 1σ 68%, 2σ 95% and 3σ 99.8%)**
- **Draw normal distribution curves, including 2 curves on the same graph**
- **Use standardised scores to compare 2 samples of data**
- **Understand the process of quality assurance and why it is necessary in the real world**
- **Calculate warning and action limits and represent on a control chart for means, medians and ranges**
- **Understand how warning and action limits are used in the manufacturing process**