Core Maths Topic List

Sequences & Growth

Growth:

- Percentages basics: A as a percentage of B, Percentage In/Decrease, Percentage Change
- Simple Interest & Compound Interest (4 types of problems)
- APR ←→ MPR (knowing the inverse of a^n is $a^{1/n}$, which is the same as $\sqrt[n]{a}$)
- Linear (straight-line), Exponential growth / decay and Reciprocal models - their equations and how to calculate their components
- Estimating the rate of change at a point on a curve
- Adjusting for the Rate of Inflation / Cost of Living Index

Sequences:

- Identify and understand the structure of Linear, Geometric, Fibonacci and Quadratic sequences
- N^{th} terms of Linear and Quadratic sequences
- Understand the relationship between the Fibonacci sequence and the Golden Ratio
- Use iteration / recurrence relationships to express sequences
- Apply the formulae for calculating the N^{th} Term and Series of a Linear / Geometric sequence
- Understand Sigma Notation and its use with Series

Statistics

- Limits of Sampling – Stratified and Representative Sampling to prevent Bias

Single-Variable Data:

- Mode, median, mean and range from un/grouped frequency tables
- Cumulative Frequency Tables and Graphs – interpreting from the graph and estimating quartiles
- Box Plots - calculating and identifying outliers, skewness and comparing two box plot diagrams
- Time Series Graphs – long and short-term trends and Moving Averages
- Histograms – drawing and interpreting
- Standard Deviation – calculating and interpreting (use of calculator)

Two-Variable Data:

- Scatter Graphs – in/dependent variables, correlation, estimated line of best fit, outliers
- Interpreting Scatter Graphs – limits of interpolation & extrapolation, correlation =/= causation
- Regression Lines – equation and its components, plotting and interpreting (use of calculator)
- PMCC (use of calculator) – applying the formula and interpreting answer
- SRCC – applying the formula and interpreting answer

Probability

- Know that increased sample size makes empirical (observed data) samples tend towards theoretical probability distributions
- Tree diagrams – how to construct them, how to calculate probabilities of outcomes and events using the diagram for independent, dependent and conditional events
- Venn diagrams – how to construct double / triple diagrams, how to calculate probabilities of outcomes and events using the diagram for independent, dependent, conditional and mutually exclusive events
- Venn Diagrams – set notation including union ($A \cup B$– 'or'), intersection ($A \cap B$ - 'and'), conditional ($A|B$) and complimentary (A' – 'not A') events
- Two-Way Tables – how to construct them, how to calculate missing values as well as probabilities of outcomes and events using the diagram for independent and conditional events
- Know that Risk = Expected Cost = $\sum$ Probability of Outcome x Cost of Outcome and use Risk calculations to justify decisions