

# UNIT 3 FURTHER MATHEMATICS

## BOOK 1 – STATISTICS

### Course Outline/Assessment

Types of Data

### Univariate Analysis

Organising Data

Frequency Tables for a Categorical Variable

Bar Charts

Single Segmented Bar Charts

Frequency Tables for Numerical Data

Histograms

Histograms Using Logarithmic Scales

Significant Figures

Dot Plots

Stem and Leaf Plots

Box Plots

Calculating and Interpreting Summary Statistics

### Measures of Centre

Mode

Median

Mean

### Measures of Spread

Range

Interquartile Range (IQR)

Standard Deviation

Five Number Summary

Boxplots

Outliers

Describing the Shape of a Distribution

The Normal Distribution

Standard Z-Scores

Samples and Populations

Summary – Measures of Centre and Spread

### Bivariate Data

Displaying, Summarising and Describing Relationships in Bivariate Data

Two Categorical Variables

One Categorical and One Numerical Variable

Back-To-Back Stem and Leaf Plots

Parallel Boxplots

Two Numerical Variables

Measuring the Strength and Direction of a Relationship ( $r$  value)

Coefficient of Determination

Correlation and Causation

Non-Casual Explanations for Observed Associations

### Exam 2 Style Question

# **BOOK 2 – STATISTICS**

## **RECURSION & FINANCIAL MODELLING**

### **Section 1: Statistics**

#### **Introduction to Regression Analysis**

The Least Squares Regression Line  
Interpolation, Extrapolation and Interpretation  
Reliability  
Interpretation of Gradient and y-intercept  
Calculating the Least Squares from Summary Data  
Residuals and Residual Plots  
Types of Residual Plots

#### **Transformations**

Choosing the Appropriate Transformation  
Transforming to Linearity  
Testing Transformations  
Why Transformations Work

#### **Displaying, Summarising and Describing Time Series Data**

Trends  
Patterns

#### **Smoothing**

Median Smoothing  
Moving Averages

#### **Deseasonalising Data**

#### **Predicting with Time Series**

### **Section 2: Recursion & Financial Modelling**

#### **Core: Recursion and Financial Modelling**

#### **Recurrence Relationships**

#### **Investments and Loans**

Simple Interest  
Compound Interest  
Nominal and Effective Interest Rates  
Reducing Balance Loans  
Amortisation Tables  
Annuity Investments

#### **Depreciation of Assets**

Flat Rate Depreciation  
Reducing Balance Depreciation  
Unit Cost Depreciation

#### **Annuities**

#### **Perpetuities**