

## **Foundations of Mathematics 20 (Grade 11)**

Designed to help students achieve the Saskatchewan curricular outcomes for Foundations of Mathematics 20 in an individualized learning system, this resource is divided into seven workbook units that come with corresponding score keys, tests, and test keys. No additional textbook is necessary. However, students will require a **TI-83 or TI-84 calculator** in order to complete this course.

**Upon completion of each of these workbook units, the student should be able to:**

### **Unit 1: Inductive and Deductive Reasoning**

- ❖ Understand the difference between inductive and deductive reasoning.
- ❖ Form and analyze conjectures.
- ❖ Prove or disprove conjectures to solve problems.
- ❖ Solve problems using inductive and deductive reasoning.
- ❖ Analyze and strategize puzzles involving spatial reasoning.

### **Unit 2: Properties of Angles and Triangles**

- ❖ Determine the measure of unknown angles using properties of angles formed by parallel lines and transversals.
- ❖ Determine the measure of unknown angles using angle properties of triangles.
- ❖ Determine the measure of unknown angles using angle properties of polygons.
- ❖ Derive proofs based on theorems and postulates about parallel lines and triangles.
- ❖ Solve problems that involve angles, parallel lines, transversals, and triangles.

### **Unit 3: Proportional Reasoning**

- ❖ Solve problems that involve rates.
- ❖ Solve problems that involve scale factors.
- ❖ Determine the relationship between scale factors, surface areas, and volumes of similar objects.
- ❖ Use the relationship between scale factor, surface area, and volume in similar objects to solve problems.
- ❖ Solve real world problems using the properties of similar triangles.

### **Unit 4: Systems of Linear Inequalities**

- ❖ Graph linear inequalities.
- ❖ Solve problems using linear inequalities in two variables.
- ❖ Solve problems using systems of inequalities in two variables.
- ❖ Graph the feasible region of a system of linear inequalities.
- ❖ Optimize a given objective quantity.
- ❖ Solve word problems by optimizing the objective quantity.

### **Unit 5: Quadratic Functions**

- ❖ demonstrate an understanding of the characteristics of quadratic functions of the form  $y = a(x - p)^2 + q$ , including:
  - Vertex.
  - Intercepts.
  - Domain and range.
  - Axis of symmetry.

## **Unit 6: Trigonometry**

- ❖ Completely solve a right triangle.
- ❖ Understand angle of elevation and angle of depression.
- ❖ Use the law of sines to solve triangles (determine side lengths and angle measures).
- ❖ Use the law of cosines to solve triangles (determine side lengths and angle measures).
- ❖ Solve problems by applying the law of sines and the law of cosines.
- ❖ Determine how many triangles are possible in the ambiguous case of an SSA triangle.

## **Unit 7: Statistical Reasoning**

- ❖ Analyze a numerical data set by creating a grouped frequency distribution table, a histogram, and a frequency polygon.
- ❖ Use a graphing calculator to analyze data as above.
- ❖ Calculate the mean, median, and the mode of a numerical data set.
- ❖ Calculate the range, mean deviation, and standard deviation of a numerical data set.
- ❖ Understand what it means for data to be normally distributed.
- ❖ Use a normal curve to estimate the number of data items lying within a specified range.
- ❖ Use a graphing calculator to draw normal curves.
- ❖ Convert actual data items to z-scores.
- ❖ Find the area under the standard normal curve.
- ❖ Find the probability of events whose outcomes are normally distributed.
- ❖ Use the area under the standard normal curve to estimate an actual data value.