

# PR\_ General University Mathematics: Grade 12

## 1. Theory of Numbers

### 1.1 Divisibility Test, Divisors, Multiples, and Factors

- 1.1.1 Divisibility Tests
- 1.1.2 Identify Multiples and Factors

### 1.2 Prime Factors

- 1.2.1 Prime and Composite Numbers
- 1.2.2 Prime Factorizations

### 1.3 Least Common Multiples and Greatest Common Factor

- 1.3.1 Finding the LCM
- 1.3.2 Applications of LCM
- 1.3.3 Greatest Common Factor
- 1.3.4 Factoring out the G.C.F

## 2. Introduction to Algebra

### 2.1 Simplifying Expressions

- 2.1.1 Identify Terms & Numerical Coefficients
- 2.1.2 Identifying and Combining Like Terms

### 2.2 Exponents

- 2.2.1 Identify and use Exponents
- 2.2.2 Product Rule
- 2.2.3 Power Rules for Exponents

### 2.3 Fractional Exponents

- 2.3.1 Simplify Expressions with exponents of the type  $(1/n)$
- 2.3.2 Simplify Expressions with exponents of the type  $(m/n)$

### 2.4 Finding Roots

- 2.4.1 Find Roots

### 2.5 Multiplication and Division of Radicals

- 2.5.1 Multiply Radicals
- 2.5.2 Simplify Radicals with the Product Rule
- 2.5.3 Simplify Quotients of Radicals with the Quotient Rule

## 3. Algebra

### 3.1 Polynomials

- 3.1.1 Polynomials, Terms, Coefficient
- 3.1.2 Evaluating a Polynomial
- 3.1.3 Adding Polynomials
- 3.1.4 Subtracting Polynomials

### **3.2 Multiplication of Polynomials**

- 3.2.1 Product of monomial & polynomial
- 3.2.2 Product of Two Polynomials
- 3.2.3 FOIL Method

### **3.3 The Quotient of Two Polynomials**

- 3.3.1 Dividing a Polynomial by a Monomial
- 3.3.2 Quotient of Two Polynomials

### **3.4 Factors GCF**

- 3.4.1 Greatest Common Factor
- 3.4.2 Factoring out the G.C.F
- 3.4.3 Factor by grouping

### **3.5 Factoring Trinomials**

- 3.5.1 Factoring Trinomial of the Type  $x^2 + bx + c$
- 3.5.2 Factoring Trinomial  $ax^2+bx+c$ ,  $a < > 0$  and  $a < > 1$

### **3.6 Special Factorization**

- 3.6.1 Difference of Two Squares
- 3.6.2 Perfect Square Trinomials

## **4. Linear Equations/ Inequalities in One Variable**

### **4.1 Solving Linear Equations in one variable**

- 4.1.1 Identify Linear Equations
- 4.1.2 Verifying Solutions of Linear Equations
- 4.1.3 Solve One-Step Equations
- 4.1.4 Solving Equations of the Type  $ax + b = c$
- 4.1.5 Use Distributive Property to Solve Equations
- 4.1.6 Solve General Linear Equations

### **4.2 Solutions of Linear Inequalities**

- 4.2.1 Addition Property of Inequality
- 4.2.2 Multiplication Property of Inequality
- 4.2.3 Solving Linear Inequalities
- 4.2.4 Three Part Inequalities
- 4.2.5 Translating Statements of Inequality

### **4.3 Distance Formula**

### **4.4 Section Formula**

## **5. Relations and Functions**

### **5.1 Functions and Relations**

- 5.1.1 Definition of a Relation
- 5.1.2 Definition of a Function
- 5.1.3 Graph of a Relation
- 5.1.4 Functional Notation  $f(x)$

### **5.2 Graphical Representation of a Function**

- 5.2.1 Connections between different forms of function representation
- 5.2.2 The rectangular coordinate system
- 5.2.3 The Distance between two points
- 5.2.4 The Midpoint of a line segment

### **5.3 Graphing Linear Equations in Two Variables**

- 5.3.1 Graphing a linear equation using points
- 5.3.2 Graphing a linear equation Using intercepts

### **5.4 Slope of a Line**

- 5.4.1 Slope of a Line Through Two Given Points
- 5.4.2 Finding the slope of a line from the equation of the line
- 5.4.3 Slope of Parallel and Perpendicular Lines

### **5.5 Equation of a Line**

- 5.5.1 Slope-Intercept Form of a Line
- 5.5.2 Graphing a Line in the Slope-Intercept Form
- 5.5.3 Equation of a line given slope and any point on the line
- 5.5.4 Writing Equations in slope intercept or Standard Form
- 5.5.5 Equation of a line in Two-point Form

## **6. Systems of Linear Equations**

### **6.1 Solving by Graphs**

- 6.1.1 Identifying a Solution of a system of Linear...
- 6.1.2 Solving by Graphing
- 6.1.3 Intersecting, Parallel, and Coincident Lines

### **6.2 Solving using Elimination by Addition**

- 6.2.1 Solve linear systems by Addition Method
- 6.2.2 Identify the Graphs of Systems

## **7. Logic**

- 7.1 Logical Reasoning: A foundation for geometric proofs
- 7.2 Logical Statements
- 7.3 Valid Vs. Invalid Arguments

## **8. Statistics**

### **8.1 Overview of Statistics**

- 8.1.1 Descriptive Statistics
- 8.1.2 Inferential Statistics
- 8.1.3 Important Terms Related to Inferential Statistics

### **8.2 Sampling Methods**

- 8.2.1 Random Sampling
- 8.2.2 Convenience Sampling
- 8.2.3 Systematic Sampling
- 8.2.4 Stratified Sampling
- 8.2.5 Cluster Sampling

### **8.3 Frequency Distributions**

#### **8.3.1 Frequency Distributions**

### **8.4 Reading Graphs: Bar, Line, Circle, Pictographs**

- 8.4.1 Reading Data from Bar and Line Graphs
- 8.4.2 Reading Data from Pie Charts
- 8.4.3 Reading Data from Pictograph

### **8.5 Constructing Graphs**

- 8.5.1 Construct a Bar Graph for a given set of Data
- 8.5.2 Construct a Pie Graph for a given set of Data

### **8.6 Frequency Polygons**

- 8.6.1 Frequency Polygons
- 8.6.2 Draw Histogram, Bar-Graph and Pie Charts

### **8.7 Measures of Central Tendency and Dispersion**

- 8.7.1 Mean, Median, and the Mode of Raw Data
- 8.7.2 Measure of Dispersion: Range, Variance, and Standard Deviation

### **8.8 Measures of Relative Standing**

- 8.8.1 Quartiles
- 8.8.2 Percentiles

## **9. Probability**

### **9.1 Introduction to Probability**

- 9.1.1 Translation of the terminology from Set Theory to Probability Theory
- 9.1.2 Theory of Probability

## **10. Financial Mathematics**

### **10.1 Understanding Percent**

- 10.1.1 Change Percents to Numbers in Fraction or De...
- 10.1.2 Converting Fractions to Percents

## **10.2 Solving Percent Problems**

10.2.1 Solve Problems using Percent Formula

## **10.3 Business Applications: Simple Interest and Compound Interest**

10.3.1 Applications involving Simple Interest, using the Formula  $I=Prt$

10.3.2 Applications involving Compound Interest

## **11. Geometry**

### **11.1 Basic Geometry**

11.1.1 Lines and Angles

11.1.2 Properties of Angles

11.1.3 Polygons, Triangles, and Quadrilaterals

11.1.4 Applications involving the use of Pythagorean Theorem

11.1.5 Perimeter and Area Applications

11.1.6 Circumference and Area of a Circle : Lengths in decimals

11.1.7 Volumes and Surface Areas of Solids : Lengths in decimals

### **11.2 Geometric Applications**

11.2.1 Perimeters and Areas of polygons (Lengths in Fractions)

## **12. Sets**

### **12.1 A brief Review of Set Theory**

12.1.1 Important Definition in Set Theory

12.1.2 Set Operations