

Discrete Math

1. Preliminaries

1.1 Real Number System

- 1.1.1 Natural Numbers, Whole Numbers, Integers and Rational Numbers
- 1.1.2 Examples of Irrational Numbers and Rational Numbers in Decimal Form
- 1.1.3 Real Number System, The Number Line and Order in Real Number System

1.2 Integers

- 1.2.1 Opposites and Absolute Values
- 1.2.2 Prime and Composite Numbers
- 1.2.3 Prime Factorization
- 1.2.4 Finding the Greatest Common Factor
- 1.2.5 Finding Multiples and LCM

1.3 Fractions

- 1.3.1 Proper and Improper Fractions
- 1.3.2 Reducing Fractions to Lowest Terms
- 1.3.3 Build Equivalent Fractions
- 1.3.4 Multiplying and Dividing Fractions
- 1.3.5 Adding and Subtracting Like/Unlike Fractions

1.4 Decimals

- 1.4.1 Rounding Decimals
- 1.4.2 Adding and Subtracting Decimals
- 1.4.3 Multiplying and Dividing Decimals
- 1.4.4 Converting Decimals to Fractions

1.5 Exponents and Radical

- 1.5.1 Laws of Exponents
- 1.5.2 Negative Exponents
- 1.5.3 Quotient Rule for Integer Exponents
- 1.5.4 Rational Exponents

2. Percents

2.1 Introduction to Percents

- 2.1.1 Converting Percents to Fractions and Vice-versa
- 2.1.2 Converting Percents to Decimals and Vice-versa

2.2 The Percent Proportion and the Percent Formula

- 2.2.1 Solve Problems using the Percent Proportion
- 2.2.2 Solving Problems Using the Percent Formula

2.3 Applications of Percent to Business

- 2.3.1 Application Problems involving Markup, Discount, Sales Tax, Commission and Profit
- 2.3.2 Applications involving Simple Interest, using the Formula $I=Prt$
- 2.3.3 Using Percents to Measure Increase or Decrease

3. Algebraic Expressions and Solving Single Variable Equations

3.1 Simplifying Expressions

- 3.1.1 Identify Terms
- 3.1.2 Identifying and Combining Like Terms
- 3.1.3 Evaluate Algebraic Expressions
- 3.1.4 Simplifying Expressions
- 3.1.5 Build Expressions from Word Phrases

3.2 Solving Linear Equations in one variable

- 3.2.1 Identify Linear Equations
- 3.2.2 Solve One-Step Equations
- 3.2.3 Solving Equations of the Type $ax + b = c$
- 3.2.4 Use Distributive Property to Solve Equations
- 3.2.5 Solve General Linear Equations

4. Linear Equations in two Variables

4.1 Linear Equations in Two Variables

- 4.1.1 Solution of a Linear Equation
- 4.1.2 Graphing a Linear Equation using Points
- 4.1.3 Graphing a Linear Equation using Intercepts

4.2 Equation of a Line

- 4.2.1 Slope of a Line Through Two Given Points
- 4.2.2 Slope-Intercept Form Equation of a Line and Graphing
- 4.2.3 Equation of a Line given Slope and any Point on the Line
- 4.2.4 Equation of a Line in Two-Point Form
- 4.2.5 Writing Equations in Slope Intercept or Standard Form
- 4.2.6 Equation of a Line in Function Form

4.3 Comparing Two Linear Functions

- 4.3.1 Solve by Graphing (Finding the common Point of Two Intersecting Linear Functions)
- 4.3.2 Intersecting, Parallel, and Coincident Lines

4.4 Application of Linear Functions to Business and Economics

- 4.4.1 Linear Cost Functions, $C(x)$
- 4.4.2 Linear Revenue Functions
- 4.4.3 Linear Profit Function
- 4.4.4 Break-Even Analysis
- 4.4.5 Linear Demand Function
- 4.4.6 Linear Supply Function
- 4.4.7 Equilibrium Point, Shortage and Excess

5. Polynomials, and Their Graphs

5.1 Polynomials and Operations on Polynomials

- 5.1.1 Degrees, Terms, Coefficient, and Types of Polynomials
- 5.1.2 Adding and Subtracting Polynomials
- 5.1.3 Product of monomials and of two Polynomials
- 5.1.4 Square of Binomials

5.2 Factoring Polynomials

- 5.2.1 Factoring Out the G.C.F
- 5.2.2 Factoring Difference of Two Squares
- 5.2.3 Factoring Sum and Difference of Two Cubes

5.3 Graphs of Polynomial Functions

- 5.3.1 Graphing a Quadratic Function
- 5.3.2 Graphing a Polynomial Function
- 5.3.3 The Behavior of a Polynomial Function at Infinity

6. Rational and Other Functions

6.1 Rational Expressions and Rational Functions

- 6.1.1 Values of Rational Expressions for Given Values
- 6.1.2 Simplifying Rational Expressions
- 6.1.3 Domain of Simple Rational Functions
- 6.1.4 Graphs of Rational Functions

6.2 Functions Revisited

- 6.2.1 Graphs of Simple Square Root and Piecewise Functions and their Domains
- 6.2.2 Evaluating Functions

7. Exponential and Logarithmic Functions

7.1 Exponential Functions

- 7.1.1 Exponential Functions and their Grap...

7.2 The Meaning of Logarithms

- 7.2.1 Graphing Logarithmic Functions
- 7.2.2 Writing Logarithmic Statements as Exponentia...
- 7.2.3 Writing Exponential Statements as Logarithmi...

7.3 The Properties of Logarithms

- 7.3.1 Expand a Single-Logarithm Expression
- 7.3.2 Writing a Multi-Logarithm Expression as a Si...

7.4 Exponential and Logarithmic Equations

- 7.4.1 Same Base Exponential Equations
- 7.4.2 Different Base Exponential Equations
- 7.4.3 Solve "Single/Multi-Logarithm" Equations

7.5 Applications of Exponential and Logarithmic Functions

- 7.5.1 Formula for Continuous Exponential Change
- 7.5.2 Compound Interest
- 7.5.3 Present Value
- 7.5.4 Effective Rate
- 7.5.5 Computing Time t for Compound Interest

8. Geometric Series and Its Applications in Finance

8.1 Geometric sequences and Geometric Series

- 8.1.1 Definition and General Term of a geometric sequences
- 8.1.2 Graphs of geometric sequences
- 8.1.3 Sum of first n terms of a geometric sequence/ infinite geometric series

8.2 Applications of Geometric Series to Finance (Annuity)

- 8.2.1 Future Value of Ordinary Annuity
- 8.2.2 Future Value of Annuity (Payment made at the end)
- 8.2.3 Finding PMT given A , r , k , t

8.3 Present Value of an Annuity and Amortization

- 8.3.1 Computing Present Value of Annuity
- 8.3.2 Amortization of a Loan
- 8.3.3 Setup Amortization Schedule
- 8.3.4 Unpaid Balance for Amortization of Loan
- 8.3.5 Computing the Time t in Annuity