

Finite Mathematics with Business Calculus | Table of Contents

Chapter 1: Algebra Reference

1.1 Properties of Real Numbers and Polynomials

- Properties of Real Numbers
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 - Use the following properties of real numbers: commutative, associative, and distributive
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 - Multiply polynomials together
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The Fundamental Counting Principle

- The Fundamental Counting Principle
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- Permutations
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- Bayes' Theorem
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 - Write the equation of a quadratic function given intercepts on a graph
 - Write the equation of a quadratic function in standard form given the equation in general form
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- Transformations of Functions
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11.4 Polynomial and Rational Functions

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 - Convert from exponential to logarithmic form
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 - Find the area of a region bounded between two curves
- Finding the Area of Compound Regions
 - Find the area of a region bounded by two functions that cross
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- Applications of Area Between Curves
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- Income Streams
 - Find the total income for a continuous stream
 - Find the present value of a continuous stream
 - Find the future value of a continuous stream
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- Consumer and Producer Surplus
 - Find the consumers' surplus at a certain price level
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 - Find the equilibrium price and the consumers' and producers' surplus at that price

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 - Use integration by parts when u and v are given
 - Use integration by parts for indefinite integrals

17.5 Integration Using Tables

- Integration Tables
 - Use a formula from an integration table to evaluate an integral
- Integration with Computer Algebra Systems
 - Use a computer algebra system to evaluate an integral
- Reduction Formulas
 - Use a table with reduction formulas to evaluate an integral

Chapter 18: Multivariable Calculus

18.1 Functions of Several Variables

- Introduction to Multivariable Functions
 - Evaluate a multivariable function
 - Sketch a point in three-dimensional space
 - Graph cross sections of a multivariable function

18.2 Partial Derivatives

- Partial Derivatives of a Function of Two Variables
 - Find the partial derivative of a function of two variables
 - Estimate the partial derivative of a function at a point from a graph or contour map
 - Total Differential
 - Use the differential to approximate the change in a function given the change in the inputs or to calculate maximum error
 - Partial Derivatives of a Function of Three or More Variables
 - Find the partial derivative of a function of three variables
 - Higher Order Partial Derivatives
 - Find the higher order partial derivatives of a function of two variables
 - The Chain Rule for Functions of Several Variables
 - Use the chain rule for one independent variable
 - Use the chain rule for two independent variables
 - Use the generalized chain rule
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18.3 Maxima and Minima

- Critical Points and the Second Derivative Test for Functions of Two Variables
 - Find critical points of a function of two variables
 - Use the second derivative test to classify critical points of a function of two variables
- Absolute Extrema and Applications for Functions of Two Variables
 - Find the absolute extrema of a function of two variables on a closed region
 - Solve maximization and minimization word problems with multiple variables

18.4 Maxima and Minima Using Lagrange Multipliers

- Lagrange Multipliers with One Constraint
 - Use Lagrange multipliers to find maximum and minimum values of a function of two variables with a single constraint
 - Use Lagrange multipliers to find maximum and minimum values of a function of three variables with a single constraint
- Lagrange Multipliers with Two Constraints
 - Use Lagrange multipliers to find maximum and minimum values of a function with two constraints

18.5 Double Integrals over Rectangular Regions

- Iterated Integrals and Properties of Double Integrals
 - Recognize and use some of the properties of double integrals
 - Evaluate a double integral over a rectangular region by writing it as an iterated integral
 - Evaluate a double integral over a rectangular region by reversing the order of integration
- Applications of Double Integrals Over Rectangular Regions
 - Find the volume under a surface
 - Find the average value of a function over a rectangular region

18.6 Double Integrals over More General Regions

- Double Integrals Over Nonrectangular Regions
 - Recognize when a function of two variables is integrable over a general region
 - Evaluate a double integral by computing an iterated integral over a region bounded by two lines and two functions
 - Double Integrals by Decomposing Regions or Changing the Order of Integration
 - Evaluate a double integral over a more complex region by decomposing the region
 - Simplify the calculation of an iterated integral by changing the order of integration
 - Applications of Double Integrals Over General Regions
 - Use double integrals to calculate the area of a general plane region
 - Use double integrals to calculate the volume of a region between two surfaces over a general plane region
 - Find the average value of a function over a general region
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Chapter 19: Trigonometric Functions

19.1 Trigonometric Functions Review

- Angles as Rotations and Radian Measures
 - Identify the measure of positive and negative angles in standard position and the quadrant of the terminal side
 - Convert between degree and radian measure of an angle
 - Understand when two angles are coterminal
- The Six Trigonometric Ratios
 - Use right triangles to evaluate sin, cos, and tan functions
 - Evaluate reciprocal trig functions using right triangles or a sin, cos, or tan function
- Sine and Cosine Values in the First Quadrant
 - Understand sin and cos values on the unit circle
 - Find exact sin and cos values for angles in the first quadrant of the unit circle
- Sine and Cosine Values with Reference Angles and a Calculator
 - Find the reference angle for a given angle
 - Use reference angles to evaluate sin and cos functions
 - Use reference angles to find coordinates on the unit circle
 - Evaluate sin and cos functions with a calculator
- The Other Trigonometric Ratios on the Unit Circle
 - Find the sec, csc, tan, and cot values for angles in the first quadrant of the unit circle
 - Use reference angles to evaluate sec, csc, tan, and cot functions
 - Evaluate trigonometric functions with a calculator
- Use Given Trigonometric Ratios to Find Other Ratios
 - Understand the relationship between the quadrant in which an angle falls and the signs of the trig functions of that angle
 - Use the pythagorean identity
 - Find the values of all trigonometric functions given coordinates on a unit circle
 - Find the values of all trigonometric functions given the value of one trigonometric function
- Characteristics of Sin and Cos Graphs
 - Graph the sin function and understand its properties
 - Graph the cos function and understand its properties
- Applications of Trigonometric Functions
 - Use sinusoidal functions to solve real-world applications

19.2 Derivatives of Trigonometric Functions

- Derivatives with Trigonometric Functions
 - Find the derivative of a function with sine or cosine
 - Use the product or quotient rule to find a derivative with sine or cosine
 - Use the chain rule with trigonometric functions
 - Applications of Trigonometric Derivatives
 - Compute derivatives of trigonometric functions in application problems
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19.3 Integration of Trigonometric Functions

- Integration with Trigonometric Functions
 - Evaluate indefinite integrals involving trigonometric functions
 - Evaluate definite integrals involving trigonometric functions
 - Compute integrals of trigonometric functions in application problems

Chapter 20: Differential Equations

20.1 Separation of Variables

- Finding Differential Equation Solutions using Separation of Variables
 - Find a general solution to a differential equation composed of two polynomials using separation of variables
 - Find a specific solution to a differential equation composed of two polynomials using separation of variables
- Application Problems using Separation of Variables
 - Solve solution concentration problems using separation of variables
 - Solve Newton's law of cooling problems using separation of variables

20.2 First-Order Linear Differential Equations

- Recognizing and Solving First-order Linear Differential Equations
 - Identify first-order linear differential equations
 - Write first-order linear differential equations in standard form
 - Solve a first-order linear differential equation using an integrating factor
- Applications of First-order Linear Differential Equations
 - Solve first-order differential equation problems about compound interest
 - Solve first-order differential equation problems involving equilibrium price

Chapter 21: Taylor Polynomials and Sequences and Series

21.1 Taylor Polynomials

- Taylor and Maclaurin Polynomials
 - Recognize a Taylor series
 - Find the Taylor polynomials for a function at a value

21.2 Taylor Series

- Representing Functions with Taylor and Maclaurin Series
 - Represent a function at a value with a Taylor series and determine the interval of convergence
 - Find the Maclaurin series for a function and show that the series converges

21.3 Operations on Taylor Series

- Finding the Maclaurin Series that Represents a Function
 - Find the Maclaurin series for a trigonometric function
 - Find the Maclaurin series for a logarithmic or exponential function
 - Find a Maclaurin series by differentiating another series
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21.4 Approximations Using Taylor Series

- Estimating Function Values with Taylor and Maclaurin Series
 - Find the Maclaurin polynomials for a function
 - Estimate a function value using Taylor polynomials
 - Determine the error of a estimated function value using Taylor's theorem
 - Estimate a trigonometric function value using Maclaurin polynomials
- Alternating Series and the Alternating Series Test
 - Determine if an alternating series converges or diverges using the alternating series test
 - Estimate the remainder of an alternating series
 - Determine whether a series converges absolutely or conditionally

21.5 Sequences and Series

- Geometric Sequences
 - Find the common ratio of a geometric sequence
 - Write terms of a geometric sequence
 - Write a recursive formula for a geometric sequence
 - Write an explicit formula for a geometric sequence
- Applications of Series
 - Solve application problems with arithmetic series
 - Solve application problems with geometric series
 - Find the equivalent fraction for a repeating decimal
 - Solve an annuity problem
- Finite and Infinite Geometric Series
 - Find the sum of a finite geometric series
 - Determine if the sum of an infinite series is defined
 - Find the sum of an infinite geometric series
- Newton's Method
 - Use Newton's method to approximate the root of a polynomial
 - Use Newton's method to approximate a square root
 - Determine when Newton's method does not work

Chapter 22: Probability and Calculus

22.1 Improper Integrals

- Improper Integrals over Infinite Intervals
 - Evaluate an improper integral over an infinite interval
 - Evaluate an improper integral from negative infinity to positive infinity

22.2 Continuous Random Variables

- Probability Density Functions
 - Understand the properties of probability density functions
 - Compute probability using a continuous probability density function
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- Cumulative Distribution Functions
 - Understand the properties of a cumulative distribution function
 - Find the cumulative distribution function given a probability density function

22.3 Parameters of Continuous Random Variables

- Mean and Median of a Probability Density Function
 - Find the mean of a continuous probability density function
 - Find the median of a continuous probability density function
- Other Parameters of Probability Density Functions
 - Find the variance and standard deviation of a continuous probability density function

22.4 Special Probability Distributions

- Uniform Distribution
 - Compute probability using the uniform distribution
 - Compute the mean, median, and standard deviation of the uniform distribution
 - Exponential Distribution
 - Compute probability using the exponential distribution
 - Compute the mean, median, and standard deviation of the exponential distribution
 - Normal Distribution
 - Understand the notation and interpret the parameters of a normal distribution
 - Compute z-scores and use them to compare values from different data sets
 - Use a table to find probabilities in a normal distribution
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