



ALGEBRA and TRIGONOMETRY

VIDEO LIBRARY OUTLINE





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CHAPTER 1 - PREREQUISITES

1.1 Real Numbers: Algebra Essentials

Topics:

- A. Classify a real number as a natural, whole, integer, rational, or irrational number (1)
- B. Perform calculations using order of operations (5 – 27 odd)
- C. Use the properties of real numbers: commutative, associative, distributive, inverse, and identity (3)
- D. Evaluate algebraic expressions (29 – 37 odd)
- E. Simplify algebraic expressions (39 – 59 odd)

Suggested Homework Exercises: 1 – 59 odd

1.2 Exponents and Scientific Notation

Topics:

- A. Simplify expressions using properties of exponents (1 – 19 odd, 25 – 43 odd)
- B. Use scientific notation (21, 23, 45 – 49 odd)

Suggested Homework Exercises: 1 – 49 odd

1.3 Radicals and Rational Exponents

Topics:

- A. Evaluate square roots (7 – 65 odd)
- B. Use the product rule to simplify square roots (7 – 65 odd)
- C. Use the quotient rule to simplify square roots (13, 17, 25, 27, 43, 59, 61)
- D. Add and subtract square roots (15, 19, 31)
- E. Rationalize denominators (29 – 33 odd, 47, 49, 53)
- F. Use rational roots (7 – 65 odd)

Suggested Homework Exercises: 1 – 65 odd

1.4 Polynomials

Topics:

- A. Identify the degree and leading coefficient of polynomials (1, 5 – 9 odd)
- B. Add and subtract polynomials (11 – 15 odd)
- C. Multiply polynomials using the distributive property (3, 17 – 37 odd, 53)
- D. Perform operations with polynomials of several variables (39 – 51 odd)

Suggested Homework Exercises: 1 – 53 odd

1.5 Factoring Polynomials

Topics:

- A. Factor the greatest common factor (GCF) of a polynomial (1, 5 – 9 odd)
- B. Factor a trinomial by grouping (AC Method) (3, 11 – 15 odd)
- C. Factor a trinomial by trial and error (17 – 35 odd)
- D. Factor a difference of squares (17 – 35 odd)
- E. Factor the sum and difference of cubes (37 – 43 odd)
- F. Factor expressions using fractional or negative exponents (45 – 49 odd)

Suggested Homework Exercises: 1 – 49 odd





1.6 Rational Expressions

Topics:

- A. Simplify rational expressions (1, 5 – 13 odd)
- B. Multiply rational expressions (15 – 23 odd)
- C. Divide rational expressions (25 – 31 odd, 53)
- D. Add and subtract rational expressions (3, 33 – 41 odd)
- E. Simplify complex rational expressions (43 – 51 odd)

Suggested Homework Exercises: 1 – 53 odd

CHAPTER 2 – EQUATIONS AND INEQUALITIES

2.1 The Rectangular Coordinate System and Graphs

Topics:

- A. Plot ordered pairs in a Cartesian Coordinate System (1, 27 – 33 odd)
- B. Graph equations by plotting points (35 – 41 odd)
- C. Find x and y-intercepts (3, 5 – 15 odd)
- D. Use the distance formula (17 – 21 odd, 43 – 47 odd)
- E. Use the midpoint formula (23, 25)

Suggested Homework Exercises: 1 – 47 odd

2.2 Linear Equations in One Variables

Topics:

- A. Solve equations in one variable algebraically (7 – 15 odd)
- B. Solve a rational equation (5, 17 – 21 odd)
- C. Find a linear equation (3, 23 – 35 odd, 41, 43, 55 – 59 odd)
- D. Given the equations of two lines, determine whether their graphs are parallel or perpendicular (1, 37, 39, 45)
- E. Write the equation of a line parallel or perpendicular to a given line (29)

Suggested Homework Exercises: 1 – 45 odd, 55 – 59 odd

2.3 Models and Applications

Topics:

- A. Set up a linear equation to solve a real-world application (1 – 15 odd)
- B. Use a formula to solve a real-world application (17 – 31 odd)
- C. Solve a formula for a given variable (33 – 53 odd)

Suggested Homework Exercises: 1 – 53 odd

2.4 Complex Numbers

Topics:

- A. Express square roots of negative numbers as multiples of i (5 – 9 odd, 35)
- B. Plot a complex number on the complex plane (11, 13)
- C. Add and subtract complex numbers (1, 15 – 19 odd)
- D. Multiply and divide complex numbers (21 – 33 odd, 37)
- E. Simplify powers of i (39, 41)

Suggested Homework Exercises: 1 – 41 odd





2.5 Quadratic Equations

Topics:

- A. Solve quadratic equations by factoring (1, 3, 7 – 17 odd)
- B. Solve quadratic equations by using the square root property (5, 19 – 23 odd)
- C. Solve quadratic equations by completing the square (25 – 31 odd)
- D. Solve quadratic equations by using the quadratic formula (33 – 43 odd, 55, 57)

Suggested Homework Exercises: 1 – 43 odd, 55, 57

2.6 Other Types of Equations (Part 1)

Topics:

- A. Solve polynomial equations by factoring (13 – 19 odd)
- B. Solve polynomial equations in quadratic form (1, 37 – 41 odd)
- C. Solve equations involving rational exponents (3 – 11 odd)
- D. Solve absolute value equations (29 – 35 odd)

Suggested Homework Exercises: 1 – 19 odd, 29 – 41 odd

2.6 Other Types of Equations (Part 2)

Topics:

- E. Solve rational equations resulting in a quadratic
- F. Solve radical equations (21 – 27 odd)

Suggested Homework Exercises: 21 – 27 odd

2.7 Linear Inequalities and Absolute Value Inequalities

Topics:

- A. Using interval notation and set notation (1, 3, 43 – 53 odd)
- B. Solve inequalities in one variable algebraically (7 – 13 odd, 39, 41,)
- C. Solve compound inequalities (29, 31)
- D. Solve absolute value inequalities (5, 15 – 27 odd, 33 – 37 odd)

Suggested Homework Exercises: 1 – 53 odd

CHAPTER 3 - FUNCTIONS

3.1 Functions and Function Notation (Part 1)

Topics:

- A. Determine whether a relation represents a function (1 – 25 odd, 61 – 67 odd)
- B. Find the value of a function (27 – 39 odd, 69 – 73 odd, 89, 91)
- C. Read information from the graph of a function (53)

Suggested Homework Exercises: 1 – 39 odd, 53, 61 – 73 odd, 89, 91

3.1 Functions and Function Notation (Part 2)

Topics:

- D. Use the vertical line test to identify functions (41 – 51 odd)
- E. Use the horizontal line test to identify one-to-one functions (55 – 59 odd)
- F. Graph the functions listed in the library of functions

Suggested Homework Exercises: 41 – 51 odd, 55 – 59 odd





3.2 Domain and Range

Topics:

- A. Find the domain of a function defined by an equation (1, 3, 7 – 37 odd, 61)
- B. Graph piecewise defined functions (5, 39 – 53 odd)

Suggested Homework Exercises: 1 – 53 odd, 61

3.3 Rates of Change and Behavior of Graphs

Topics:

- A. Find the average rate of change of a function (1, 5 – 17 odd, 27 – 33 odd, 43 – 47 odd)
- B. Use a graph to determine where a function is increasing, decreasing, or constant (19, 21)
- C. Use a graph to locate local maxima and local minima (23)
- D. Use a graph to locate absolute maximum and absolute minimum (3, 25, 41)

Suggested Homework Exercises: 1 – 33 odd, 41 – 47 odd

3.4 Composition of Functions

Topics:

- A. Combine functions using algebraic operations (5 – 9 odd)
- B. Create a new function by composition of functions (3, 13 – 25 odd)
- C. Evaluate composite functions (11, 43 – 79 odd)
- D. Find the domain of a composite function (1, 5 – 9 odd)
- E. Decompose a composite function into its component functions (27 – 41 odd)

Suggested Homework Exercises: 1 – 79 odd

3.5 Transformation of Functions (Part 1)

Topics:

- A. Graph functions using vertical and horizontal shifts (1, 7 – 29 odd)
- B. Graph functions using reflections about the x-axis and y-axis (33 – 45 odd)
- C. Determine whether a function is even, odd, or neither (5, 47 – 51 odd)

Suggested Homework Exercises: 1, 5 – 29 odd, 33 – 51 odd

3.5 Transformation of Functions (Part 2)

Topics:

- D. Graph functions using compressions and stretches (3, 53 – 61 odd)
- E. Combine transformations (63 – 81 odd)

Suggested Homework Exercises: 3, 53 – 81 odd

3.6 Absolute Value Functions

Topics:

- A. Graph an absolute value function (9 – 31 odd)
- B. Solve an absolute value equation (1 – 7, 11 – 23 odd in Section 1.6 of Precalculus)

Suggested Homework Exercises: 1 – 31 odd, also do 11 – 23 odd in Section 1.6 of the Precalculus book





3.7 Inverse Functions

Topics:

- A. Verify inverse functions (1, 3, 17)
- B. Determine the domain and range of an inverse function (13, 15)
- C. Find the inverse of a function (5, 7 – 15 odd, 33 – 41 odd)
- D. Use the graph of a one-to-one function to graph its inverse function on the same axes (19 – 31 odd)

Suggested Homework Exercises: 1 – 41 odd

CHAPTER 4 – LINEAR FUNCTIONS

4.1 Linear Functions (Part 1)

Topics:

- A. Represent a linear function (1)
- B. Calculate and interpret slope (15 – 27 odd)
- C. Write the point-slope form of an equation (29 – 35 odd)
- D. Write and interpret a linear function (7 – 13 odd, 89 – 95, 115 – 121 odd)

Suggested Homework Exercises: 1, 7 – 35 odd, 89 – 95 odd, 115 – 121 odd

4.1 Linear Functions (Part 2)

Topics:

- A. Graph linear functions (41 – 45 odd, 71 – 83 odd)
- B. Write the equation for a linear function from the graph of a line (57 – 69 odd, 85, 87)
- C. Determine whether lines are parallel or perpendicular (37, 39, 47 – 51 odd)
- D. Write the equation of a line parallel or perpendicular to a given line (53, 55)

Suggested Homework Exercises: 37 – 87 odd

4.2 Modeling with Linear Functions

Topics:

- A. Identify steps to model and solve problems (1, 3)
- B. Build linear models from verbal descriptions (9 – 43 odd)
- C. Build systems of linear models (45 – 57 odd)

Suggested Homework Exercises: 1, 3, 9 – 57 odd

4.3 Fitting Linear Models to Data

Topics:

- A. Draw and interpret scatter plots (9 – 17 odd)
- B. Find the line of best fit and use it to make predictions (1, 7, 19, 21)
- C. Distinguish between linear and nonlinear relations (3, 5, 23)

Suggested Homework Exercises: 1 – 23 odd





CHAPTER 5 – POLYNOMIAL AND RATIONAL FUNCTIONS

5.1 Quadratic Functions

Topics:

- A. Recognize characteristics of parabolas (1 – 45 odd)
- B. Understand how the graph of a parabola is related to its quadratic function (1 – 13 odd, 21 – 33 odd)
- C. Graph parabolas using their characteristics (35 – 45 odd)
- D. Solve applications involving a quadratic function's minimum or maximum value (15 – 19 odd, 71, 73)

Suggested Homework Exercises: 1 – 45 odd, 71, 73

5.2 Power Functions and Polynomial Functions

Topics:

- A. Identify power functions (1, 7 – 11 odd)
- B. Identify end behavior of power functions (3, 5, 17 – 23 odd, 47, 49)
- C. Identify polynomial functions (7 – 11 odd, 25 – 29 odd)
- D. Identify the degree and leading coefficient of polynomial functions (13, 15)
- E. Identify the turning points of polynomial functions (31 – 45 odd)

Suggested Homework Exercises: 1 – 49 odd

5.3 Graphs of Polynomial Functions

Topics:

- A. Use factoring to find zeros of polynomial functions (1, 7 – 23 odd)
- B. Identify zeros and their multiplicities (31 – 41 odd)
- C. Use the Intermediate Value Theorem (3, 25 – 29 odd)
- D. Graph polynomial functions (5, 43 – 47 odd)
- E. Use given information to write the equation of a polynomial (49 – 65 odd)

Suggested Homework Exercises: 1 – 65 odd

5.4 Dividing Polynomials

Topics:

- A. Use long division to divide polynomials (1 – 13 odd)
- B. Use synthetic division to divide polynomials (15 – 43 odd, 49 – 53 odd)
- C. Use polynomial division to divide polynomials (65 – 69 odd)

Suggested Homework Exercises: 1 – 43 odd, 49 – 53 odd, 65 – 69 odd

5.5 Zeros of Polynomial Functions (Part 1)

Topics:

- A. Evaluate a polynomial using the Remainder Theorem (1, 7 – 13 odd)
- B. Use the Factor Theorem to solve a polynomial equation (15 – 21 odd)
- C. Use the Rational Zeros Theorem to find possible rational zeros (3, 5, 57, 59)
- D. Use Descartes' Rule of Signs (47 – 55 odd)
- E. Find zeros of a polynomial function (23 – 31 odd)

Suggested Homework Exercises: 1 – 31 odd, 47 – 59 odd





5.5 Zeros of Polynomial Functions (Part 2)

Topics:

- E. Find zeros of a polynomial function (33 – 45 odd)
- F. Use the Fundamental Theorem of Algebra (41 – 45 odd)
- G. Use the Conjugate Pairs Theorem (67, 69)

Suggested Homework Exercises: 33 – 45 odd, 67, 69

5.6 Rational Functions (Part 1)

Topics:

- A. Find the domain of a rational function (1 – 19 odd)
- B. Identify vertical asymptotes (11 – 19 odd, 75 – 79 odd)
- C. Identify horizontal and oblique (slant) asymptotes (11 – 19 odd, 31, 33)
- D. Identify x- and y-intercepts of rational functions (21, 23)

Suggested Homework Exercises: 1 – 23 odd, 31, 33, 75 – 79 odd

5.6 Rational Functions (Part 2)

Topics:

- E. Graph rational functions (39 – 49 odd)
- F. Write the equation of a rational function (51 – 63 odd)

Suggested Homework Exercises: 39 – 63 odd

5.7 Inverses and Radical Functions

Topics:

- A. Find the inverse of a polynomial function (1 – 39 odd)
- B. Restrict the domain to find the inverse of a polynomial function (17 – 39 odd)

Suggested Homework Exercises: 1 – 39 odd

5.8 Modeling Using Variation

Topics:

- A. Solve direct variation problems (1, 5 – 9 odd, 25, 27)
- B. Solve inverse variation problems (11 – 15 odd, 35 – 39 odd)
- C. Solve problems involving joint variation (3, 17 – 23 odd, 29 – 33 odd)
- D. Solve applications using variation models (51 – 59 odd)

Suggested Homework Exercises: 1 – 39 odd, 51 – 59 odd

CHAPTER 6 – EXPONENTIAL AND LOGARITHMIC FUNCTIONS

6.1 Exponential Functions

Topics:

- A. Evaluate exponential functions (1 – 11 odd, 15, 17, 45, 61, 63)
- B. Find the equation of an exponential function (19 – 27 odd)
- C. Use the compound interest formula (29 – 35 odd)
- D. Evaluate exponential functions with base e (39 – 43 odd, 47, 49, 65, 67)

Suggested Homework Exercises: 1 – 11 odd, 15 – 35 odd, 39 – 49 odd, 61 – 67 odd





6.2 Graphs of Exponential Functions

Topics:

A. Graph exponential functions (1, 9, 11)

B. Graph exponential functions using transformations (3 – 7 odd, 23 – 41 odd)

Suggested Homework Exercises: 1 – 11 odd, 23 – 41 odd

6.3 Logarithmic Functions

Topics:

A. Convert from logarithmic form to exponential form (1, 3, 7 – 15 odd, 27 – 35 odd)

B. Convert from exponential form to logarithmic form (17 – 25 odd)

C. Evaluate logarithms (37, 43 – 49 odd, 57)

D. Use natural logarithms (5, 39, 41, 51 – 55 odd)

Suggested Homework Exercises: 1 – 57 odd

6.4 Graphs of Logarithmic Functions

Topics:

A. Identify the domain of a logarithmic function (3, 7 – 25 odd)

B. Graph logarithmic functions using transformations (1, 5, 27 – 45 odd)

Suggested Homework Exercises: 1 – 45 odd

6.5 Logarithmic Properties

Topics:

A. Use the product rule for logarithms (3, 9, 15 – 21 odd)

B. Use the quotient rule for logarithms (5, 7, 11, 15, 21, 23)

C. Use the power rule for logarithms (1, 13, 15 – 23 odd, 31)

D. Expand logarithmic expressions (3 – 7 odd, 15 – 19 odd)

E. Condense logarithmic expressions (9 – 13 odd, 21, 23)

F. Use the change-of-base formula (25 – 29 odd, 33 – 37 odd)

Suggested Homework Exercises: 1 – 37 odd

6.6 Exponential and Logarithmic Equations

Topics:

A. Use like bases to solve exponential equations (1 – 9 odd)

B. Use logarithms to solve exponential equations (11 – 27 odd)

C. Use the definition of a logarithm to solve logarithmic equations (29 – 35 odd)

D. Use the one-to-one property of logarithms to solve logarithmic equations (3, 37 – 49 odd)

Suggested Homework Exercises: 1 – 49 odd

6.7 Exponential and Logarithmic Models

Topics:

A. Model exponential growth and decay (1 – 5, 28 – 33 all, 35 – 39 odd)

B. Use Newton's Law of Cooling (40 – 45 all)

C. Use logistic-growth models (7, 9)

D. Choose an appropriate model for data (11)

Suggested Homework Exercises: 1 – 11 odd, 28 – 33 all, 35 – 39 odd, 40 – 45 all





6.8 This section is not covered in this video library

CHAPTER 7 – THE UNIT CIRCLE: SINE AND COSINE FUNCTIONS

7.1 Angles

Topics:

- A. Draw angles in standard position (1, 3, 7 – 21 odd)
- B. Convert between degrees and radians (27 – 39 odd)
- C. Find coterminal angles (51 – 57 odd)
- D. Find the length of a circular arc (41 – 45 odd)

Suggested Homework Exercises: 1, 3, 7 – 21 odd, 27 – 45 odd, 51 – 57 odd

7.2 Right Triangle Trigonometry

Topics:

- A. Use right triangles to evaluate trigonometric functions (11 – 41 odd)
- B. Find function values for $30^\circ \left(\frac{\pi}{6}\right)$, $45^\circ \left(\frac{\pi}{4}\right)$, and $60^\circ \left(\frac{\pi}{3}\right)$ (1, 3)
- C. Use cofunctions of complementary angles (5 – 9 odd)
- D. Use right triangle trigonometry to solve applied problems (53, 55)

Suggested Homework Exercises: 1 – 41 odd, 53, 55

7.3 Unit Circle

Topics:

- A. Define sine and cosine functions using the unit circle (1, 7 – 21 odd, 61 – 71 odd)
- B. Find sines and cosines of special angles using the unit circle (7 – 21 odd)
- C. Find reference angles (3, 5, 23 – 33 odd)
- D. Use reference angles to evaluate trig functions (35 – 53 odd)

Suggested Homework Exercises: 1 – 53 odd, 61 – 71 odd

7.4 The Other Trigonometric Functions

Topics:

- A. Find exact values of secant, cosecant, tangent, and cotangent of $30^\circ \left(\frac{\pi}{6}\right)$, $45^\circ \left(\frac{\pi}{4}\right)$, and $60^\circ \left(\frac{\pi}{3}\right)$ (1, 7 – 17 odd, 49 – 51 odd)
- B. Use reference angles to evaluate secant, cosecant, tangent, and cotangent (19 – 41 odd)
- C. Use properties of even and odd trig functions (43 – 47 odd)
- D. Recognize and use fundamental identities (3, 70, 71)
- E. Evaluate trig functions with a calculator (53 – 61 odd)

Suggested Homework Exercises: 1, 3, 7 – 61 odd, 70, 71





CHAPTER 8 – PERIODIC FUNCTIONS

8.1 Graphs of Sine and Cosine Functions

Topics:

A. Graph sine and cosine functions (1)

B. Graph variations of sine and cosine functions (3 – 13 odd, 19 – 39 odd)

Suggested Homework Exercises: 1 – 13 odd, 19 – 39 odd

8.2 Graphs of the Other Trigonometric Functions

Topics:

A. Graph tangent, cotangent, secant, and cosecant functions (1 – 9 odd)

B. Graph variations of tangent, cotangent, secant, and cosecant functions
(11 – 15 odd, 19 – 35 odd)

Suggested Homework Exercises: 1 – 15 odd, 19 – 35 odd

8.3 Inverse Trigonometric Functions

Topics:

A. Understand and use the inverse sine, cosine, and tangent functions (1 – 5 odd)

B. Find the exact values of expressions involving the inverse sine, cosine, and tangent
functions (9 – 15 odd, 23, 53, 57)

C. Use a calculator to evaluate inverse trigonometric functions (17 – 21 odd)

D. Find exact values of composite functions with inverse trigonometric functions
(25 – 35 odd)

Suggested Homework Exercises: 1 – 5 odd, 9 – 35 odd, 53, 57

CHAPTER 9 – TRIGONOMETRIC IDENTITIES AND EQUATIONS

9.1 Verifying Trigonometric Identities

Topics:

A. Simplify trigonometric expressions using algebra and the identities (1 – 23 odd)

B. Verify trigonometric identities (29 – 33 odd)

Suggested Homework Exercises: 1 – 23 odd, 29 – 33 odd

9.2 Sum and Difference Identities

Topics:

A. Use sum and difference formulas for sine, cosine, and tangent
(3 – 13 odd, 21, 23, 43, 45)

B. Use sum and difference formulas for cofunctions (1, 15 – 19 odd)

C. Use sum and difference formulas to verify identities (47 – 51 odd)

Suggested Homework Exercises: 1 – 23 odd, 43 – 51 odd





9.3 Double-Angle, Half-Angle, and Reductions Formulas

Topics:

- A. Use double-angle formulas to find exact values (5 – 11 odd, 25, 29 – 33 odd)
- B. Use double-angle formulas to verify identities (35, 37)
- C. Use reduction formulas to simplify an expression (1, 39, 41)
- D. Use half-angle formulas to find exact values (3, 13 – 23 odd, 27)

Suggested Homework Exercises: 1 – 41 odd

9.4 Sum-to-Product and Product-to-Sum Formulas

Topics:

- A. Express sine and cosine products as sums (5 – 9 odd, 17 – 25 odd, 33, 35, 57 – 61 odd)
- B. Express sine and cosine sums as products (11 – 15 odd, 27 – 31 odd, 37 – 43 odd)

Suggested Homework Exercises: 5 – 43 odd, 57 – 61 odd

9.5 Solving Trigonometric Equations (Part 1)

Topics:

- A. Solve linear trigonometric equations in sine and cosine (1 – 15 odd)
- B. Solve equations involving a single trigonometric function (23 – 31 odd)
- C. Solve trigonometric equations using a calculator (73, 75)
- D. Solve trigonometric equations that are in quadratic form (41, 43)

Suggested Homework Exercises: 1 – 15 odd, 23 – 31 odd, 41, 43, 73, 75

9.5 Solving Trigonometric Equations (Part 2)

Topics:

- E. Solve trigonometric equations using fundamental identities (51 – 57 odd, 65)
- F. Solve trigonometric equations with multiple angles (17 – 21 odd)
- G. Solve right triangle problems (95 – 103 odd)

Suggested Homework Exercises: 17 – 21 odd, 51 – 57 odd, 65, 95 – 103 odd

CHAPTER 10 – FURTHER APPLICATIONS OF TRIGONOMETRY

10.1 Non-right Triangles: Law of Sines

Topics:

- A. Use the Law of Sines to solve oblique triangles (1 – 25 odd, 31 – 49 odd)
- B. Find the area of an oblique triangle using the sine function (27, 29)
- C. Solve applied problems using the Law of Sines (59 – 67 odd)

Suggested Homework Exercises: 1 – 49 odd, 59 – 67 odd

10.2 Non-right Triangles: Law of Cosines

Topics:

- A. Use the Law of Cosines to solve oblique triangles (7 – 25 odd, 33, 35, 43, 45)
- B. Solve applied problems using the Law of Cosines (63, 67, 69, 71)
- C. Use Heron's formula to find the area of a triangle (27 – 31 odd, 47, 49)

Suggested Homework Exercises: 7 – 35 odd, 43 – 49 odd, 63, 67, 69, 71





10.3 Polar Coordinates

Topics:

- A. Plot points using polar coordinates (1 – 5 odd, 41 – 53 odd)
- B. Convert from polar coordinates to rectangular coordinates (7, 9)
- C. Convert from rectangular coordinates to polar coordinates (11 – 15 odd)
- D. Convert a rectangular equation to a polar equation (17 – 27 odd)
- E. Convert a polar equation to a rectangular equation (29 – 39 odd)

Suggested Homework Exercises: 1 – 53 odd

10.4 Polar Coordinates: Graphs

Topics:

- A. Test polar equations for symmetry (1, 7 – 11 odd, 15)
- B. Graph polar equations by plotting points (3, 5, 17 – 43 odd)

Suggested Homework Exercises: 1 – 11 odd, 15 – 43 odd

10.5 Polar Form of Complex Numbers

Topics:

- A. Plot complex numbers in the complex plane (1, 47 – 55 odd)
- B. Find the absolute value of a complex number (7 – 11 odd)
- C. Write complex numbers in polar form (3, 13, 15)
- D. Convert a complex number from polar to rectangular form (17 – 21 odd)
- E. Find products and quotients of complex numbers in polar form (23 – 33 odd)
- F. Find powers of complex numbers in polar form (5, 35 – 39 odd)
- G. Find roots of complex numbers in polar form (41 – 45 odd)

Suggested Homework Exercises: 1 – 55 odd

10.6 & 10.7 Parametric Equations

Topics:

- A. Graph parametric equations (10.7: 13 – 19 odd, 23 – 31 odd)
- B. Find an equivalent rectangular equation for parametric equations (10.6: 1 – 25 odd)
- C. Determine parametric equations for a rectangular equation (10.6: 31 – 37 odd)
- D. Solve applied problems involving projectile motion (10.7: 63 – 69 odd)

Suggested Homework Exercises for 10.6: 1 – 25 odd, 31 – 37 odd

Suggested Homework Exercises for 10.7: 13 – 19 odd, 23 – 31 odd, 63 – 69 odd

10.8 Vectors

Topics:

- A. Properties of vectors (1, 9 – 15 odd, 29, 31)
- B. Perform vector addition and scalar multiplication (17 – 21 odd, 37 – 45 odd)
- C. Find the unit vector in the direction of \mathbf{v} (23 – 27 odd)
- D. Perform operations with vectors in terms of \mathbf{i} and \mathbf{j} (3, 5, 19, 21, 33, 35)
- E. Find the dot product of two vectors (33, 35)

Suggested Homework Exercises: 1 – 45 odd





CHAPTER 11 – SYSTEMS OF EQUATIONS AND INEQUALITIES

11.1 Systems of Linear Equations: Two Variables

Topics:

- A. Solve systems of equations by graphing (41 – 45 odd)
- B. Solve systems of equations by substitution (1 – 19 odd)
- C. Solve systems of equations by addition (elimination) (21 – 39 odd)
- D. Use systems of equations to investigate profits (57 – 77 odd)

Suggested Homework Exercises: 1 – 45 odd, 57 – 77 odd

11.2 Systems of Linear Equations: Three Variables

Topics:

- A. Solve systems of three equations in three variables (1 – 29 odd, 37, 51 – 59 odd)
- B. Identify inconsistent systems of equations containing three variables (1 – 29 odd, 37, 51 – 59 odd)
- C. Express the solution of a system of dependent equations containing three variables (1 – 29 odd, 37, 51 – 59 odd)

Suggested Homework Exercises: 1 – 29 odd, 37, 51 – 59 odd

11.3 Systems of Nonlinear Equations and Inequalities: Two Variables

Topics:

- A. Solve a system of nonlinear equations using substitution (7, 9, 17, 21, 25 – 35 odd)
- B. Solve a system of nonlinear equations using elimination (11 – 15 odd, 17, 21, 25 – 35 odd)
- C. Graph a nonlinear inequality (39)
- D. Graph a system of nonlinear inequalities (41)

Suggested Homework Exercises: 7 – 17 odd, 21, 25 – 35 odd, 39, 41

11.4 Partial Fractions (Part 1)

Topics:

- A. Decompose $\frac{P(x)}{Q(x)}$, where $Q(x)$ has only non-repeated linear factors (1, 7 – 19 odd)
- B. Decompose $\frac{P(x)}{Q(x)}$, where $Q(x)$ has repeated linear factors (21 – 27 odd)

Suggested Homework Exercises: 1, 7 – 27 odd

11.4 Partial Fractions (Part 2)

Topics:

- C. Decompose $\frac{P(x)}{Q(x)}$, where $Q(x)$ has a non-repeated irreducible quadratic factor (31 – 41 odd)
- D. Decompose $\frac{P(x)}{Q(x)}$, where $Q(x)$ has a repeated irreducible quadratic factor (45 – 51 odd)

Suggested Homework Exercises: 31 – 41 odd, 45 – 51 odd





11.5 Matrices and Matrix Operations

Topics:

- A. Find the sum and differences of two matrices (1, 7 – 11 odd, 25 – 29 odd)
- B. Find scalar multiples of a matrix (13 – 17 odd, 25 – 29 odd)
- C. Find the product of two matrices (3, 5, 19 – 45 odd)

Suggested Homework Exercises: 1 – 45 odd

11.6 Solving Systems with Gaussian Elimination

Topics:

- A. Write the augmented matrix of a system of equations (1, 7, 9)
- B. Write the system of equations from an augmented matrix (11 – 15 odd)
- C. Perform row operations on a matrix (17 – 43 odd)
- D. Solve a system of linear equations using matrices (17 – 43 odd)

Suggested Homework Exercises: 1, 7 – 43 odd

11.7 Solving Systems with Inverses

Topics:

- A. Find the inverse of a matrix (1 – 23 odd)
- B. Solve a system of linear equations using an inverse matrix (27 – 39 odd)

Suggested Homework Exercises: 1 – 23 odd, 27 – 39 odd

11.8 Solving Systems with Cramer's Rule

Topics:

- A. Evaluate 2 X 2 determinants (1 – 13 odd)
- B. Use Cramer's Rule to solve a system of equations in two variables (25 – 33 odd, 49)
- C. Evaluate 3 X 3 determinants (15 – 21 odd)
- D. Use Cramer's Rule to solve a system of three equations in three variables (37 – 43 odd, 51)

Suggested Homework Exercises: 1 – 21 odd, 25 – 43 odd, 49, 51

CHAPTER 12 – ANALYTIC GEOMETRY

12.1 The Ellipse (Part 1)

Topics:

- A. Write equations of ellipses in standard form (1 – 25 odd, 47 – 55 odd)

Suggested Homework Exercises: 1 – 25 odd, 47 – 55 odd

12.1 The Ellipse (Part 2)

Topics:

- B. Graph ellipses centered at the origin (33, 35)
- C. Graph ellipses not centered at the origin (37 – 45 odd)
- D. Solve applied problems involving ellipses (65, 67)

Suggested Homework Exercises: 33 – 45 odd, 65, 67





12.2 The Hyperbola

Topics:

A. Write equations of hyperbolas in standard form (1 – 25 odd, 45 – 55 odd)

B. Graph hyperbolas centered at the origin (31, 33)

C. Graph hyperbolas not centered at the origin (35 – 43 odd)

Suggested Homework Exercises: 1 – 25 odd, 31 – 55 odd

12.3 The Parabola

Topics:

A. Write equations of parabolas in standard form (1 – 29 odd, 45 – 55 odd)

B. Graph parabolas with vertices at the origin (31, 33)

C. Graph parabolas with vertices not at the origin (35 – 43 odd)

D. Solve applied problems involving parabolas (63 – 67 odd)

Suggested Homework Exercises: 1 – 55 odd, 63 – 67 odd

12.4 This section is not covered in this video library

12.5 This section is not covered in this video library

CHAPTER 13 – SEQUENCES, PROBABILITY, and COUNTING THEORY

13.1 Sequences and Their Notations

Topics:

A. Write the terms of a sequence defined by an explicit formula (1, 3, 7 – 25 odd)

B. Write the terms of a sequence defined by a recursive formula (27 – 37 odd)

C. Use factorial notation (5, 39 – 45 odd)

Suggested Homework Exercises: 1 – 45 odd

13.2 Arithmetic Sequences

Topics:

A. Find the common difference for an arithmetic sequence (1 – 9 odd)

B. Write terms of an arithmetic sequence (11, 13)

C. Use a recursive formula for an arithmetic sequence (27 – 39 odd)

D. Use an explicit formula for an arithmetic sequence (15 – 25 odd, 41 – 55 odd)

Suggested Homework Exercises: 1 – 55 odd

13.3 Geometric Sequences

Topics:

A. Find the common ratio for a geometric sequence (1 – 13 odd)

B. Write the terms of a geometric sequence (15)

C. Use a recursive formula for a geometric sequence (19 – 31 odd, 45)

D. Use an explicit formula for a geometric sequence (33 – 43 odd)

Suggested Homework Exercises: 1 – 15 odd, 19 – 45 odd





13.4 Series and Their Notations

Topics:

- A. Use summation notation (1, 7, 9)
- B. Use the formula for the sum of the first n terms of an arithmetic series (13, 15, 31, 35, 37)
- C. Use the formula for the sum of the first n terms of a geometric series (19, 21, 33, 39, 41)
- D. Use the formula for the sum of an infinite geometric series (23, 25, 43, 45)

Suggested Homework Exercises: 1, 7, 9, 13, 15, 19 – 25 odd, 31 – 45 odd

13.5 Counting Principles (Part 1)

Topics:

- A. Solve counting problems using the Addition Principle (1, 3, 7 – 13 odd)
- B. Solve counting problems using the Multiplication Principle (3, 7 – 13 odd, 41 – 45 odd)
- C. Solve counting problems using permutations involving n distinct objects (15 – 19 odd, 47)
- D. Solve counting problems using permutations involving n non-distinct objects (31, 33, 53)

Suggested Homework Exercises: 1, 3, 7 – 19 odd, 31, 33, 41 – 47 odd, 53

13.5 Counting Principles (Part 2)

Topics:

- E. Solve counting problems using combinations (5, 49, 51)
- F. Find the number of subsets of a given set (21 – 29 odd)
- G. Mixed Practice (49, 51)

Suggested Homework Exercises: 5, 21 – 29 odd, 49, 51

13.6 The Binomial Theorem

Topics:

- A. Identify binomial coefficients (1, 5 – 11 odd)
- B. Use the Binomial Theorem (3, 13 – 19 odd, 23 – 27 odd)
- C. Use the Binomial Theorem to find a single term (31 – 37 odd)

Suggested Homework Exercises: 1 – 19 odd, 23 – 27 odd, 31 – 37 odd

13.7 Probability

Topics:

- A. Construct probability models (1 – 5 odd)
- B. Compute the probability of equally likely outcomes (7, 15, 17, 19, 27 – 33 odd)
- C. Compute the probability of the union of two events (21, 35)
- D. Compute the probability of mutually exclusive events (9 – 13 odd, 25, 37 – 45 odd)
- E. Use the complement rule to find probabilities (13, 23)

Suggested Homework Exercises: 1 – 45 odd

