ALGEBRA and TRIGONOMETRY

VIDEO LIBRARY OUTLINE

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VIDEO LIBRARY OVERVIEW

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 $30°\left(\frac{\pi}{6}\right), 45°\left(\frac{\pi}{4}\right), and\ 60°\left(\frac{\pi}{3}\right)$ (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
    $30°\left(\frac{\pi}{6}\right), 45°\left(\frac{\pi}{4}\right), and\ 60°\left(\frac{\pi}{3}\right)$ (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 **v** (23 – 27 odd)
D. Perform operations with vectors in terms of **i** and **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