



# PRECALCULUS

VIDEO LIBRARY OUTLINE





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## CHAPTER 1 - FUNCTIONS

### 1.1 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**

### 1.1 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**

### 1.2 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**

### 1.3 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**

### 1.4 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**





### 1.5 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**

### 1.5 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**

### 1.6 Absolute Value Functions

Topics:

- A. Graph an absolute value function (37 – 51 odd)
- B. Solve an absolute value equation (1, 3, 7 – 27 odd)
- C. Solve an absolute value inequality (5, 29 – 35 odd)

**Suggested Homework Exercises: 1 – 51 odd**

### 1.7 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 2 – LINEAR FUNCTIONS

### 2.1 Linear Functions

Topics:

- A. Represent a linear function (1, 5)
- B. Calculate and interpret slope (3, 15 – 29 odd, 39)
- C. Write the point-slope form of an equation (31 – 37 odd)
- D. Write and interpret a linear function (7 – 13 odd, 41 – 53 odd, 69 – 75 odd)

**Suggested Homework Exercises: 1 – 53 odd, 69 – 75 odd**





## 2.2 Linear Functions

Topics:

- A. Graph linear functions (33 – 59 odd)
- B. Write the equation for a linear function from the graph of a line (13 – 17 odd, 61, 63)
- C. Determine whether lines are parallel or perpendicular (1 – 11 odd, 19 – 23 odd)
- D. Write the equation of a line parallel or perpendicular to a given line (25, 27)

**Suggested Homework Exercises: 1 – 27 odd, 33 – 63 odd**

## 2.3 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**

## 2.4 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 3 – POLYNOMIAL AND RATIONAL FUNCTIONS

## 3.1 Complex Numbers

Topics:

- A. Express square roots of negative numbers as multiples of  $i$  (17 – 43 odd)
- B. Plot complex numbers on the complex plane (13, 15)
- C. Add and subtract complex numbers (17 – 43 odd)
- D. Multiply and divide complex numbers (17 – 43 odd)
- E. Simplify powers of  $i$  (17 – 43 odd)

**Suggested Homework Exercises: 13 – 43 odd**

## 3.2 Quadratic Functions (Part 1)

Topics:

- A. Recognize characteristics of parabolas (1 – 25 odd)
- B. Understand how the graph of a parabola is related to its quadratic function (7 – 25 odd, 45 – 51 odd, 59 – 69 odd)
- C. Graph parabolas using their characteristics (53 – 57 odd)

**Suggested Homework Exercises: 1 – 25 odd, 45 – 69 odd**





### 3.2 Quadratic Functions (Part 2)

Topics:

D. Solve quadratic equations involving complex number solutions (27 – 43 odd)

E. Solve applications involving a quadratic function's minimum or maximum value (85, 87, 91)

**Suggested Homework Exercises: 27 – 43 odd, 85, 87, 91**

### 3.3 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**

### 3.4 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**

### 3.5 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**

### 3.6 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**





### 3.6 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**

### 3.7 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**

### 3.7 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**

### 3.8 Inverses and Radical Functions

Topics:

- A. Find the inverse of a polynomial function (1 – 41 odd)
- B. Restrict the domain to find the inverse of a polynomial function (17 – 31 odd)

**Suggested Homework Exercises: 1 – 41 odd**

### 3.9 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 4 – EXPONENTIAL AND LOGARITHMIC FUNCTIONS

### 4.1 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**





#### 4.2 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**

#### 4.3 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**

#### 4.4 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**

#### 4.5 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**

#### 4.6 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**

#### 4.7 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**





4.8 This section is not covered in this video library

## CHAPTER 5 – TRIGONOMETRIC FUNCTIONS

**Note: I have covered the Chapter 5 sections in a different order than how they are presented in the book. I have covered the Chapter 5 sections in the following order: Section 5.1, Section 5.4, Section 5.2, and then Section 5.3.**

### 5.1 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**

### 5.2 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**

### 5.3 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**

### 5.4 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**





## CHAPTER 6 – PERIODIC FUNCTIONS

### 6.1 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**

### 6.2 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**

### 6.3 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 7 – TRIGONOMETRIC IDENTITIES AND EQUATIONS

### 7.1 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**

### 7.2 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**





### 7.3 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**

### 7.4 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**

### 7.5 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**

### 7.5 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**

### 7.6 This section is not covered in this video library

## CHAPTER 8 – FURTHER APPLICATIONS OF TRIGONOMETRY

### 8.1 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**





## 8.2 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**

## 8.3 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**

## 8.4 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**

## 8.5 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**

## 8.6 & 8.7 Parametric Equations

Topics:

- A. Graph parametric equations (8.7: 13 – 19 odd, 23 – 31 odd)
- B. Find an equivalent rectangular equation for parametric equations (8.6: 1 – 25 odd)
- C. Determine parametric equations for a rectangular equation (8.6: 31 – 37 odd)
- D. Solve applied problems involving projectile motion (8.7: 63 – 69 odd)

**Suggested Homework Exercises for 8.6: 1 – 25 odd, 31 – 37 odd**

**Suggested Homework Exercises for 8.7: 13 – 19 odd, 23 – 31 odd, 63 – 69 odd**





## 8.8 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 9 – SYSTEMS OF EQUATIONS AND INEQUALITIES

### 9.1 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**

### 9.2 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**

### 9.3 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**

### 9.4 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**





#### 9.4 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**

#### 9.5 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**

#### 9.6 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**

#### 9.7 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**

#### 9.8 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 10 – ANALYTIC GEOMETRY

#### 10.1 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**





### 10.1 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**

### 10.2 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**

### 10.3 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**

10.4 This section is not covered in this video library

10.5 This section is not covered in this video library

## CHAPTER 11 – SEQUENCES, PROBABILITY, and COUNTING THEORY

### 11.1 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**

### 11.2 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**





### 11.3 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**

### 11.4 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**

### 11.5 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**

### 11.5 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**

### 11.6 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**





## 11.7 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**

