Curriculum Guide College Algebra

Unit 1: Review of Basic Algebra

Biblical Worldview Essential Questions:
"Polynomial" literally means "many names."
What is the significance of the many names for God in the Bible?

15 Lessons

CA#1

Objectives	Methods	Resources	Assessment
The students will 1. Add/subtract/multiply/divide polynomials. 2. Factor polynomials. 3. Divide polynomials using synthetic division. 4. Reduce/add/subtract/mult/divide rational expressions. 5. Work with nth roots and rational exponents. 6. Simplify radicals.	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • worksheets • homework • YouTube video • internet websites	Algebra & Trigonometry, 8th ed Michael Sullivan Pearson Prentice Hall 2008	• 5 minute checks • check homework • Quizzes • Mid-Chapter Test • Free-Response Chapter test • Oral response • Board work

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Unit 2: Equations and Inequalities

Biblical Worldview Essential Questions:
What are some biblical guidelines for solving problems we encounter in our everyday lives?

20 Lessons

CA#2, CA#5

Objectives	Methods	Resources	Assessment
The students will 1. Solve linear equations or equations that lead to linear equations. 2. Solve quadratic equations using factoring, completing the square, and quadratic formula. 3. Perform the four basic operations on complex numbers. 4. Solve quadratic equations in the complex number system. 5. Solve equations involving radicals. 6. Solve equations quadratic in form. 7. Solve higher degree polynomial equations by factoring. 8. Solve linear inequalities and express the answer in interval notation. 9. Solve equations and inequalities involving absolute value. 10. Solve applied problems.	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • worksheets • homework • YouTube video • internet websites	Algebra & Trigonometry, 8th ed Michael Sullivan Pearson Prentice Hall 2008	• 5 minute checks • check homework • Quizzes • Mid-Chapter Test • Free-Response Chapter test • Oral response • Board work

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Unit 3: The Rectangular Coordinate System and Graphs of Equations

<u>Biblical Worldview Essential Questions</u>:
A rectangular coordinate system allows one to locate any point with respect to the origin or to another point.
How does the Bible provide a frame of reference for our Christian life, with respect to God and with respect to other people?

5 Lessons

CA#2

Objectives	Methods	Resources	Assessment
The students will 1. Use the distance and midpoint formulas. 2. Graph equations by plotting points. 3. Find the intercepts of an equation. 4. Determine whether the graph of an equation has symmetry.	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • worksheets • homework • YouTube video • internet websites	Algebra & Trigonometry, 8th ed Michael Sullivan Pearson Prentice Hall 2008	• 5 minute checks • check homework • Quizzes • Mid-Chapter Test • Free-Response Chapter test • Oral response • Board work

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Unit 4: Functions

Biblical Worldview Essential Questions:
Functions have dependent and independent variables.
How is mankind dependent on God? How is God independent of mankind?

15 Lessons

CA#2, CA#4

Objectives	Methods	Resources	Assessment
The students will 1. Determine whether a relation determines a function. 2. Evaluate a function. 3. Find the domain of a function. 4. Find the sum, difference, product, and quotient of two functions. 5. Determine whether a particular graph represents a function. 6. Obtain information such as domain, range, and intercepts from the graph of a function. 7. Determine whether a function is even, odd, or neither from the equation and graph of the function. 8. Determine from the graph of a function where it is increasing, decreasing or constant. 9. Use the graph of a function to determine its local minimum and maximum values. 10. Find the average rate of change of a function. 11. Graph the functions in the library of functions which is a list of commonly encountered function. 12. Be familiar with piecewise-defined functions. 13. Graph functions using horizontal and vertical shifts, using compressions and stretches, and using reflections about the x-axis or y-axis.	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • worksheets • homework • YouTube video • internet websites	Algebra & Trigonometry, 8th ed Michael Sullivan Pearson Prentice Hall 2008	• 5 minute checks • check homework • Quizzes • Mid-Chapter Test • Free-Response Chapter test • Oral response • Board work

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Unit 5: Linear and Quadratic Functions

<u>Biblical Worldview Essential Questions</u>:
Quadratic functions are characterized by either an absolute maximum or an absolute minimum.
Describe the absolute maximum and the absolute minimum in eternity?

7 Lessons

CA#2, CA#4

Objectives	Methods	Resources	Assessment
The students will 1. Graph linear functions. 2. Determine whether a function is increasing or decreasing. 3. Apply linear functions to problem solving. 4. Graph a quadratic function and identify its vertex and axis of symmetry.	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • worksheets • homework • YouTube video • internet websites	Algebra & Trigonometry, 8th ed Michael Sullivan Pearson Prentice Hall 2008	• 5 minute checks • check homework • Quizzes • Mid-Chapter Test • Free-Response Chapter test • Oral response • Board work

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Unit 6: Polynomial and Rational Functions

<u>Biblical Worldview Essential Questions</u>:
An asymptote is a line that a function heads toward but never reaches.
How is this analogous to the Christian life on earth?

15 Lessons

CA#2, CA#4

Objectives	Methods	Resources	Assessment
The students will 1. Identify polynomial functions and their degree. 2. Identify real zeros of a polynomial functions. 3. Analyze the graph of a polynomial function. 4. Find the domain and vertical and horizontal asymptotes of a rational function. 5. Analyze the graph of a rational function.	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • worksheets • homework • YouTube video • internet websites	Algebra & Trigonometry, 8th ed Michael Sullivan Pearson Prentice Hall 2008	• 5 minute checks • check homework • Quizzes • Mid-Chapter Test • Free-Response Chapter test • Oral response • Board work

Unit 7: Exponential and Logarithmic Functions

<u>Biblical Worldview Essential Questions</u>:
Why did the lifespans of the patriarchs from Noah to Joseph decrease exponentially?

20 Lessons

CA#4, CA#5

Objectives	Methods	Resources	Assessment
The students will 1. Form a composite function and evaluate it and find its domain. 2. Find, verify and graph the inverse of a function. 3. Evaluate and graph exponential functions. 4. Define the number *e*. 5. Change exponential expressions to logarithmic expressions, and vice versa. 6. Evaluate and determine the domain of a logarithmic function. 7. Work with properties of logarithms. 8. Solve exponential and logarithmic equations. 9. Work with applications involving the law of uninhibited growth and the law of decay.	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • worksheets • homework • YouTube video • internet websites	Algebra & Trigonometry, 8th ed Michael Sullivan Pearson Prentice Hall 2008	• 5 minute checks • check homework • Quizzes • Mid-Chapter Test • Free-Response Chapter test • Oral response • Board work

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Unit 8: Trigonometric Functions

<u>Biblical Worldview Essential Questions</u>:
What did God create or establish that are periodic in nature? (i.e. they recur repetitively and regularly)

25 Lessons

CA#3, CA#4

Objectives	Methods	Resources	Assessment
The students will 1. Convert between degrees and radians 2. Find the length of an arc on a circle. 3. Find the values of trigonometric functions of acute angles. 4. Use the fundamental identities of trigonometric functions. 5. Find the exact value of trigonometric functions for 30, 45, and 60 degrees. 6. Find the exact values for general angles. 7. Find coterminal and reference angles. 8. Use the unit circle to find exact values of trigonometric functions. 9. Use periodic and even/odd properties to evaluate trig functions. 10. Graph sine and cosine functions. 11. Determine amplitude and period of sinusoidal functions. 12. Graph tangent, cotangent, secant, and cosecant functions.	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • worksheets • homework • YouTube video • internet websites	Algebra & Trigonometry, 8th ed Michael Sullivan Pearson Prentice Hall 2008	• 5 minute checks • check homework • Quizzes • Mid-Chapter Test • Free-Response Chapter test • Oral response • Board work

Unit 9: Analytic Trigonometry

<u>Biblical Worldview Essential Questions</u>:
Many of God's commands are negatively stated, such as "Thou shall not steal." Is it possible to restate them in a positive way? Is there benefit in doing so?

21 Lessons

CA#6

Objectives	Methods	Resources	Assessment
The students will 1. Find exact values of inverse trig functions. 2. Use properties of inverse trig functions. 3. Solve equations involving inverse trig functions. 4. Use algebra to simplify trig expressions 5. Establish trigonometric identities. 6. Use sum and difference formulas to find exact values of trigonometric functions. 7. Use double- and half-angle formulas to exact values of trig functions. 8. Solve equations involving trigonometric functions.	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • worksheets • homework • YouTube video • internet websites	Algebra & Trigonometry, 8th ed Michael Sullivan Pearson Prentice Hall 2008	• 5 minute checks • check homework • Quizzes • Mid-Chapter Test • Free-Response Chapter test • Oral response • Board work

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Unit 10: Applications of Trigonometric Functions

Biblical Worldview Essential Questions:
Word problems or "story" problems are important for applying math concepts to the real world.
Why did Jesus tell "stories" or parables as a regular part of His teaching?

12 Lessons

CA#7

Objectives	Methods	Resources	Assessment
The students will 1. Solve applied problems using right triangles. 2. Solve triangles using the law of sines. 3. Solve triangles using the law of cosines. 4. Solve applied problems using law of sines and law of cosines.	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • worksheets • homework • YouTube video • internet websites	Algebra & Trigonometry, 8th ed Michael Sullivan Pearson Prentice Hall 2008	• check homework • Quizzes • Mid-Chapter Test • Free-Response Chapter test • Oral response • Board work