Curriculum Guide Calculus

Unit 1: Functions and Models

5 Lessons (1 week)

C#1

Objectives	Methods	Resources	Assessment
The students will 1. review basic ideas concerning functions. 2. graph, transform and combine functions. 3. represent functions in four ways: by an equation, in a table, by a graph, or in words. 4. solve problems involving the main types of functions that occur in calculus. 5. use functions as mathematical models of real-world phenomena. 6. graph functions using graphing calculators. 7. understand limitations of graphing calculators.	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • homework	• Calculus, 6th Ed., James Stewart; Thomson Brooks/Cole, 2008	• check homework • Quizzes • Tests • Oral response • Board work

Curriculum Guide Calculus

Unit 2: Limits and Rates of Change

13 Lessons (3 weeks)

C#1

Objectives	Methods	Resources	Assessment
The students will 8. understand historical development of limits from the tangent problem and the velocity problem 9. develop "intuitive feel" for limits. 10. use algebraic techniques for computing limits of functions. 11. use algebraic techniques for computing limits at infinity. 12. understand and use precise definition of limits. 13. calculate limits using limit laws 14. understand and use formal definition of continuity. 15. investigate average and instantaneous rates of change and how they relate to limits.	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • homework	• Calculus, 6th Ed., James Stewart; Thomson Brooks/Cole, 2008	• check homework • Quizzes • Tests • Oral response • Board work

Curriculum Guide Calculus

Unit 3: The Derivative

27 Lessons (5.5 weeks)

C#2, C#3

Objectives	Methods	Resources	Assessment
The students will 16. investigate relationship between the slope of a curve at a point and the rate of change. 17. develop concept of derivative and relate it to rates of change and slopes of curves. 18. develop concept of the derivative as a function 19. determine when a function is not differentiable 20. use special techniques to find derivatives of functions. 21. apply derivatives to rates of change problems in the natural and social sciences 22. memorize and use formulas for derivatives of trigonometric functions. 23. find derivatives of composition of functions by using the chain rule. 24. perform implicit differentiation. 25. find higher order derivatives 26. solve related rate problems. 27. understand and use differentials to perform local linear approximation.	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • homework	• Calculus, 6th Ed., James Stewart; Thomson Brooks/Cole, 2008	• check homework • Quizzes • Tests • Oral response • Board work

Unit 4: The Derivative in Graphing and Applications

14 Lessons (3 weeks)

C#3, C#4

Objectives	Methods	Resources	Assessment
The students will 28. use the first derivative to determine where a function is increasing or decreasing. 29. find absolute extrema values on open and closed intervals. 30. understand and use Rolle's Theorem and the Mean-Value Theorem. 31. use the second derivative to determine where a function is concave up or concave down. 32. use the first and second derivative tests to determine where relative extrema and inflection points occur on the graph of a function. 33. use derivatives and previously learned properties of functions to completely analyze the graph of a function. 34. use derivatives to analyze rectilinear motion. 35. solve optimization problems. 36. use Newton's Method for finding roots of functions. 37. find the antiderivative of a function 38. use a direction field to find the specific solution of a differential equation	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • homework	• Calculus, 6th Ed., James Stewart; Thomson Brooks/Cole, 2008	• check homework • Quizzes • Tests • Oral response • Board work

Unit 5: Integrals

12 Lessons (2.5 weeks)

C#4

Objectives	Methods	Resources	Assessment
The students will 39. understand historical development of integrals from area and distance problems 40. understand and use the rectangle method for finding area between the graph of a function and the x-axis. 41. find area under the curve using the limit of the summation of areas of rectangles. 42. define and associate the definite integral as the limit of Riemann sums. 43. understand and use properties of definite integrals 44. understand and use the antiderivative method for finding area between the graph of a function and the x-axis. 45. use the Fundamental Theorem of Calculus to evaluate definite integrals. 46. relate antiderivative to the indefinite integral and memorize basic integration formulas 47. use properties of indefinite integrals and the net change theorem to solve problems. 48. perform integration using the substitution technique. 49. evaluate definite integrals using the substitution method.	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • homework	• Calculus, 6th Ed., James Stewart; Thomson Brooks/Cole, 2008	• check homework • Quizzes • Tests • Oral response • Board work

Unit 6: Applications of the Definite Integral in Geometry, Science, and Engineering

16 Lessons (2.5 weeks)

C#4

Objectives	Methods	Resources	Assessment
The students will 50. use the definite integral to find the area between two curves. 51. find volumes of three-dimensional solids by slices, disks and washers methods. 52. find volumes of three-dimensional solids by cylindrical shells methods. 53. use definite integrals to find "work" as defined in physics and engineering.	• teacher lecture • teacher working examples on the board • student guided practice of problems in book • cooperative learning groups • individual assistance • partner work • homework	• Calculus, 6th Ed., James Stewart; Thomson Brooks/Cole, 2008	• check homework • Quizzes • Tests • Oral response • Board work