



2012 Curriculum Catalog

Pre-calculus

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Course Overview

Pre-calculus is a full-year, high school credit course that is intended for the student who has successfully mastered the core algebraic and conceptual geometric concepts covered in the prerequisite courses: Algebra I, Geometry, and Algebra II. The course primarily focuses on the skills and methods of analytic geometry and trigonometry while investigating further relationships in functions, probability, number theory, limits, and the introduction of derivatives.

Upon successfully completing the course, students should have mastered the following concepts:

- Perform operations on functions including composition and inverses.
- Graph, evaluate, and solve exponential and logarithmic functions and equations.
- Utilize the unit circle in evaluating trigonometric identities; prove trigonometric identities; graph trigonometric functions and their inverses.
- Solve application problems involving right triangle trigonometry, special right triangles, and law of sines and cosines.
- Convert between Cartesian and polar forms; graph equations in polar coordinates.
- Graph and solve quadratic equations that include conic sections.
- Calculate probabilities, combinations, and permutations.
- Calculate summations and limits of functions.
- Relate analytical operations of limits, slope of a tangent line, and the definition of a derivative.

UNIT 1: RELATIONS AND FUNCTIONS	
Assignment Titles	
1. Course Overview	8. Algebra of Functions: Composition
2. Ordered-Pair Numbers: Relations	9. Algebra of Functions: Inverse
3. Ordered-Pair Numbers: Functions	10. Quiz 2: Relations and Functions
4. Ordered-Pair Numbers: Rules of Correspondence	11. Special Project
5. Quiz 1: Relations and Functions	12. Test
6. Algebra of Functions: Notation	13. Alternate Test
7. Algebra of Functions: Arithmetic	14. Glossary and Credits

UNIT 2: FUNCTIONS	
Assignment Titles	
1. Linear Functions: Graphs	11. Greatest Integer Function
2. Linear Functions: Equations	12. Exponential Function
3. Quiz 1: Linear Functions	13. Logarithmic Function
4. 2nd-Degree Functions: Solutions	14. Function Combinations
5. Relationships Between Zeros and Coefficients	15. Quiz 4: Special Functions
6. Quadratic Inequalities	16. Special Project
7. Quiz 2: Second-Degree Functions	17. Test
8. Polynomial Functions	18. Alternate Test
9. Nth-Degree Equations	19. Glossary and Credits
10. Quiz 3: Polynomial Functions	

UNIT 3: TRIGONOMETRIC FUNCTIONS
Assignment Titles

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|--|-------------------------------|
| 1. Definition of the Trigonometric Functions | 10. Quiz 5: Quadrantal Angles |
| 2. Quiz 1: Trigonometric Functions | 11. Special Angles |
| 3. Evaluation of Functions | 12. Quiz 6: Special Angles |
| 4. Quiz 2: Evaluation of Functions | 13. Radian Measure |
| 5. Angle Location | 14. Quiz 7: Radian Measure |
| 6. Quiz 3: Angle Location | 15. Special Project |
| 7. Reduction Formulas | 16. Test |
| 8. Quiz 4: Reduction Formulas | 17. Alternate Test |
| 9. Quadrantal Angles | 18. Glossary and Credits |

UNIT 4: CIRCULAR FUNCTIONS AND THEIR GRAPHS
Assignment Titles

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|---|---|
| 1. Circular Functions | 11. Amplitude of Circular Functions |
| 2. Quiz 1: Circular Functions | 12. Quiz 6: Amplitude of Circular Functions |
| 3. Circular Functions of Special Angles | 13. Period of Circular Functions |
| 4. Quiz 2: Circular Functions of Special Angles | 14. Quiz 7: Period of Circular Functions |
| 5. Graphs of Sin and Cos | 15. Phase Shift of Circular Functions |
| 6. Quiz 3: Graphs of Sin and Cos | 16. Quiz 8: Phase Shift of Circular Functions |
| 7. Other Graphs | 17. Special Project |
| 8. Quiz 4: Other Graphs | 18. Test |
| 9. Applications | 19. Alternate Test |
| 10. Quiz 5: Applications | 20. Glossary and Credits |

UNIT 5: IDENTITIES AND FUNCTIONS OF MULTIPLE ANGLES
Assignment Titles

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|---|--|
| 1. Reciprocal Relations | 12. Quiz 6: Additional Sum and Difference Formulas |
| 2. Quiz 1: Reciprocal Relations | 13. Double- and Half-Angle Formulas |
| 3. Pythagorean Relations | 14. Quiz 7: Double- and Half-Angle Formulas |
| 4. Quiz 2: Pythagorean Relations | 15. Identities |
| 5. Quotient Relations | 16. Quiz 8: Identities |
| 6. Quiz 3: Quotient Relations | 17. Trigonometric Equations |
| 7. Trigonometric Identities | 18. Quiz 9: Trigonometric Equations |
| 8. Quiz 4: Trigonometric Identities | 19. Special Project |
| 9. Cosine of the Sum of Two Angles | 20. Test |
| 10. Quiz 5: Cosine of the Sum of Two Angles | 21. Alternate Test |
| 11. Additional Sum and Difference Formulas | 22. Glossary and Credits |

UNIT 6: SEMESTER REVIEW AND EXAM
Assignment Titles

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|-----------|---------------------------|
| 1. Review | 3. Alternate Exam: Form A |
| 2. Exam | 4. Alternate Exam: Form B |

UNIT 7: APPLICATION OF TRIGONOMETRIC FUNCTIONS
Assignment Titles

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|---|---|
| 1. Trigonometric Functions of Any Angle | 10. More Applications |
| 2. Quiz 1: Trigonometric Functions of Any Angle | 11. Quiz 5: More Applications |
| 3. More Trigonometric Functions of Any Angle | 12. Inclined Plane Application |
| 4. Quiz 2: Trigonometric Functions | 13. Navigation Application |
| 5. Applied Problems | 14. Quiz 6: Additional Application Problems |
| 6. Law of Cosines | 15. Special Project |
| 7. Quiz 3: Law of Cosines | 16. Test |
| 8. Law of Sines | 17. Alternate Test |
| 9. Quiz 4: Law of Sines | 18. Glossary and Credits |

UNIT 8: INVERSE TRIGONOMETRIC FUNCTIONS AND POLAR COORDINATES
Assignment Titles

1. The Inverse Sine Function	14. Quiz 7: Converting Coordinates
2. Quiz 1: The Inverse Sine Function	15. Converting Cartesian Equations to Polar Equations
3. The Inverse Cosine Function	16. Quiz 8: Converting Cartesian Equations to Polar Equations
4. Quiz 2: The Inverse Cosine Function	17. Converting Polar Equations to Cartesian Equations
5. The Inverse Tangent Function	18. Quiz 9: Converting Polar Equations to Cartesian Equations
6. Quiz 3: The Inverse Tangent Function	19. Graphing Polar Equations
7. Other Inverse Functions	20. Quiz 10: Graphing Polar Equations
8. Quiz 4: Other Inverse Functions	21. Project: De Moivre's Theorem
9. Graphs of Inverse Functions	22. Special Project
10. Quiz 5: Graphs of Inverse Functions	23. Test
11. Graphing Polar Coordinates	24. Alternate Test
12. Quiz 6: Graphing Polar Coordinates	25. Glossary and Credits
13. Converting Coordinates	

UNIT 9: QUADRATIC EQUATIONS
Assignment Titles

1. The Circle	13. The Parabola Applied
2. The Circle Continued	14. The Hyperbola
3. Equation from Three Points	15. Quiz 2: Quadratic Equations
4. Equation from Three Points Applied	16. Translation
5. The Ellipse	17. Translation of Equations
6. The Ellipse: Standard Form	18. Rotation
7. The Ellipse: General Form	19. Rotation of Equations
8. The Ellipse Applied	20. Quiz 3: Quadratic Equations
9. Quiz 1: Quadratic Equations	21. Special Project
10. The Parabola	22. Test
11. The Parabola Continued	23. Alternate Test
12. The Parabola: Standard Form	24. Glossary and Credits

UNIT 10: PROBABILITY
Assignment Titles

1. Definitions, Sample Spaces, and Probability	8. Circular Permutations
2. Addition of Probabilities	9. Combinations
3. Multiplication of Probabilities	10. Quiz 2: Probability
4. Quiz 1: Probability	11. Special Project
5. Definitions	12. Test
6. Permutation of N Things: Different	13. Alternate Test
7. Permutation of N Things: Not All Different	14. Glossary and Credits

UNIT 11: REVIEW
Assignment Titles

1. Summation	12. Review Mathematics 1201 and 1202
2. Proofs by Mathematical Induction	13. Review Mathematics 1203 and 1204
3. Quiz 1: Calculus	14. Review Mathematics 1205 and 1206
4. Functional Notation	15. Review Mathematics 1207 and 1208
5. Difference Quotient	16. Review Mathematics 1209 and 1210
6. Limits	17. Quiz 4: Calculus
7. Quiz 2: Calculus	18. Special Project
8. Slope of a Curve	19. Test
9. Slope of a Line	20. Alternate Test
10. Angle Between Curves	21. Glossary and Credits
11. Quiz 3: Calculus	

UNIT 12: SEMESTER REVIEW AND EXAM**Assignment Titles**

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| 1. Review | 3. Alternate Exam: Form A |
| 2. Exam | 4. Alternate Exam: Form B |

UNIT 13: FINAL EXAM**Assignment Titles**

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|---------------------------|---------------------------|
| 1. Exam | 3. Alternate Exam: Form B |
| 2. Alternate Exam: Form A | |