PRE-CALCULUS – Unit Plan and Syllabus

This is the course of study for Pre-Calculus. Each number represents one class period (or one quiz) and the skills that students should master – as demonstrated in class or on a quiz. Students will have "completed" a topic when they have demonstrated said mastery. Students will have passed Pre-Calculus when they have completed everything on this list.

Date Completed, Grade

Unit I (a) – Linear, Quadratic, Polynomial Functions

1. Review linear functions, quadratic functions, and graphing. _____
2. Review roots, factors, curve sketching, and synthetic division. _____
3. Practice and review. _____

Unit I (b) – Inequalities and Functions

4. Recognize odd and even functions, translations. _____
5. Graph inverse functions, periodic functions, and parent functions. _____
6. Practice and review. _____

Unit I (c) – Exponents and Logarithms

7. Calculate exponential growth and decay. _____
8. Simplify logarithmic functions. _____
9. Understand e, and uses of logarithms. _____
10. Graph e and natural log functions. _____
11. Practice and review. _____
12. Take the Unit I test. _____

Unit II – Analytic Geometry and Circular Functions

13. Relate circle graphs and equations to triangles and coordinates. _____
14. Use equations to plot intersecting circle graphs. _____
15. Use equations to graph ellipses. _____
16. Use equations to graph hyperbolas. _____
17. Use equations to graph conic sections. _____
18. Practice and review. _____
19. Take the Unit II test. _____

Unit III – Trigonometric Functions

20. Relate trigonometric functions to the unit circle. _____
21. Use the six trigonometric functions to find angle and side measures. _____
22. Relate trigonometric graphs angle measures. _____
23. Describe angles in degrees and radians. _____
24. Practice using the six trigonometric functions to solve problems. _____
25. Calculate arc length for circles. _____
26. Practice and review. _____
27. Take the Unit III test. _____

Unit IV – Equations, Applications, and Triangle Trigonometry

28. Use trigonometric functions to calculate angle and side measures. _____
29. Use the law of sines and the law of cosines. _____
30. Model periodic behavior with trigonometric functions. _____
31. Identify amplitude and phase from trigonometric equations. _____
32. Practice and review. _____
33. Take the Unit IV test. _____

Unit V – Trigonometric Addition Formulas, Polar Coordinates, and Complex Numbers

34. Graph equations using polar coordinates. _____
35. Convert rectangular coordinates to polar and vice-versa. _____
36. Use various trigonometric formulas and identities to simplify equations. _____
37. Practice and review. _____
38. Take the Unit V test. _____

Unit VI – Inverse Trigonometric Functions and Trigonometric Equations and Applications of Trigonometry and Vectors

39. Understand inverse trigonometric functions and their graphs. _____
40. Solve practical problems involving inverse trigonometric functions. _____
41. Solve conditional equations. _____
42. Use half-angle, double-angle, and multiple-angle formulas. _____
43. Use trigonometry to calculate strength and direction of vectors. _____
44. Calculate dot products. _____
45. Practice and review. _____
46. Take the Unit VI test. _____

Unit VII – Sequences and Series

47. Generate formulas to describe arithmetic and geometric sequences. _____
48. Use summation notation to describe a series. _____
49. Find the sum of an infinite series. _____
50. Find the limit of a series. _____
51. Practice and review. _____
52. Take the Unit VII test. _____

Unit VIII – Limits, Series, Iterated Functions and Introduction to Calculus

53. Identify continuity and limits of functions. _____
54. Find the limit of a rational function. _____
55. Graph functions, limits, continuity, and asymptotes. _____
56. Use limits to estimate the slope of a tangent line. _____
57. Understand the derivative as a limit of a rational function. _____
58. Use limits to estimate the area under a curve. _____
59. Understand the integral as a limit of summation notation. _____
60. Practice and review. _____
61. Take the Unit VIII test. _____