Kolbe Academy
Home School

PRECALCULUS
HIGH SCHOOL MATH
Kolbe Honors Level

Foerster Precalculus: Concepts and Applications, 3rd Edition

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Kolbe Academy Home School	♦ SYLLABUS ♦	Honors Precalculus High School Math

COURSE TITLE: Precalculus

COURSE DESCRIPTION:

This course is a one-year course (10 credits) in high school Precalculus. The honors track, although up to the parent's discretion, is aimed for students who have shown aptitude toward mathematics in their Geometry and Algebra II courses, or who have successfully completed the honors Algebra II/Trig course. All students pursuing honors should expect to find the content and pace of the coursework challenging and should be sure to allot extra time for their studies.

The Kolbe Honors (H) track, although up to the parent's discretion, is recommended for students who have achieved one of the following: a "B" or better in Algebra II/Trig (H) or an "A" in Algebra II (K). All students pursuing honors should expect to find the content and pace of the coursework challenging and should be sure to allot extra time for their studies

COURSE TEXTS AND MATERIALS:

- *Precalculus: Concepts and Applications*, Paul A. Foerster, © 2012, 3rd edition
- *Precalculus Parent/Instructor Material* –: available in Parent Portal
  Provides access to:
  - PDF copy of textbook Solutions Manual
  - Graphing Calculator Programs
- *Math Without Borders* Foerster's Precalculus Home Study Companion w/Solutions Flash Drive, Optional
- Programmable Graphing Calculator, preferably TI-83 or TI-84 model

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SCOPE AND SEQUENCE:

Unit 1: Algebraic, Exponential, and Logarithmic Functions

1. Chapter 1- Functions and Mathematical Models
2. Chapter 2 - Properties of Elementary Functions
3. Chapter 3 - Fitting Functions to Data (Honors Only)
4. Chapter 4- Polynomial and Rational Functions

Unit 2: Trigonometric and Periodic Functions

1. Chapter 5 - Periodic Functions and Right Triangle Problems
2. Chapter 6 - Applications of Trigonometric and Circular Functions
3. Chapter 7- Trigonometric Function Properties, Identities, and Parametric Functions
4. Chapter 8- Properties of Combined Sinusoids
5. Chapter 9- Triangle Trigonometry

Unit 2: Analytic Geometry

1. Chapter 10 - Conic Sections and Quadratic Surfaces
2. Chapter 11- Polar Coordinates, Complex Numbers, and Moving Objects
3. Chapter 12 – Three Dimensional Vectors (Honors Only)

Unit 4: Introduction to Discrete and Continuous Mathematics

1. Chapter 14 - Probability, and Functions of a Random Variable
2. Chapter 15 - Sequences and Series
3. Chapter 16 – Introduction to Limits, Derivatives, and Integrals (Honors Only)

COURSE PLAN "AT A GLANCE" OUTLINE:

Semester 1	Material Covered:	Exam Schedule:
Week 1	Chapter 1: 1-1 through 1-4	
Week 2	Chapter 1: 1-5 through Chapter 2: 2-1	Chapter 1 Test
Week 3	Chapter 2: 2-2 through 2-5	
Week 4	Chapter 2: 2-6 through 3-1	Chapter 2 Test
Week 5	Chapter 3: 3-2 through 3-5	
Week 6	Chapter 3: 3-5 through Chapter 4: 4-2	Chapter 3 Test
Week 7	Chapter 4: 4-3 through 4-5	
Week 8	Chapter 4: 4-6 through 4-8	Chapter 4 Test
Week 9	Chapter 5: 5-1 through 5-4	
Week 10	Chapter 5: 5-5 through Chapter 6: 6-2	Chapter 5 Test
Week 11	Chapter 6: 6-2 through 6-6	
Week 12	Chapter 6: 6-7 through 6-9	Chapter 6 Test
Week 13	Chapter 7: 7-1 through 7-2	
Week 14	Chapter 7: 7-3 through 7-4	
Week 15	Chapter 7: 7-5 through 7-6	
Week 16	Chapter 7:7. Begin Exam Review	Chapter 7 Test
Week 17	Semester 1 Review	
Week 18	Exam Week	Precalculus Honors Semester 1 Exam

Semester 2	Material Covered:	Exam Schedule:
Week 1	Chapter 8: 8-1 through 8-3	
Week 2	Chapter 8: 8-5 through 8-7	Chapter 8 Test
Week 3	Chapter 9: 9-1 through 9-5	
Week 4	Chapter 9: 9-6 through 9-8	
Week 5	Chapter 10:1 through 10:3	Chapter 9 Test
Week 6	Chapter 10: 10-4 through Chapter 11: 11-1	Chapter 10 Test
Week 7	Chapter 11: 11-2 through 11-5	
Week 8	Chapter 11: 11-5 through Chapter 12: 12-1	Chapter 11 Test
Week 9	Chapter 12: 12-2 through 12-5	
Week 10	Chapter 12: 12-6 through 12-9	
Week 11	Chapter 14: 14-1 through 14-4	Chapter 12 Test
Week 12	Chapter 14: 14-5 through 14-7	
Week 13	Chapter 14: 14-7 through Chapter 15: 15-1	Chapter 14 Test
Week 14	Chapter 15: 15-2 through 15-4	
Week 15	Chapter 16: 16-1 through 16-3	Chapter 15 Test
Week 16	Chapter 16: 16-3 through 16-5; Begin Exam Review	Chapter 16 Test
Week 17	Semester 2 Review	
Week 18	Exam Week	Precalculus Honors Semester 2 Exam

COURSE PLAN METHODOLOGY:

The ***Quick Review*** problems that appear at the beginning of the exercises with each lesson are meant to be completed in 5 minutes or less. Students should **not** write out all the steps neatly for these problems, but instead try to quickly write down the answer and move on. These problems are meant to recall concepts learned in previous sections, chapters or math courses. Overall, these problems will help a student to think quickly, a skill that is useful in taking standardized tests, and will assist the student in remembering useful mathematical tools learned in the past. These problems can be used as short, timed quizzes if desired.

A selection of exercises from the ***Problem Sets*** will be assigned with each section for the student to complete. A sufficient number of problems have been carefully chosen to help the student become proficient in a topic and prepare them for the Kolbe semester exams. The author's intent was not to have students complete all of the problems in the book, but to have a diverse number of problems available to the teacher. Most odd numbered problems are answered in the back of the student text. It is advisable for students to check their work as they go along in an assignment to be sure that they have understood the methodology of the section. The solution manual may be used by the student to check any even numbered problems. If additional work is needed, students may want to pick a few of the even numbered problems for further practice.

The ***Chapter Tests and Comprehensive Semester Exams*** may be found after the weekly lessons in this course plan. ***Answer Keys*** may be found after the Chapter Tests and answer keys and are to be taken at the end of each semester. A full two hours should be allotted for the student to complete Kolbe Academy's Semester Exams

It follows then, that students are expected to be utilizing a programmable ***Graphing Calculator.*** This skill is especially important now that the use of a graphing calculator is permissible on the math portion of the standardized tests including the SAT, ACT, and PSAT. The Kolbe Academy exams are set up specifically to hone testing skills with and without the use of the graphing calculator. Kolbe Academy has traditionally suggested the use of the TI-83 or TI-84 graphing calculator models. Graphing calculator programs required to complete problems are available for free to students and are accessed through the *Precalculus Parent/Instructor Materials* available in the Parent Portal.

DIPLOMA REQUIREMENTS:

Summa Cum Laude diploma candidates are required to follow either the Kolbe Core course (K) or Kolbe Honors course (H) track for this Precalculus course. ***Magna Cum Laude*** and ***Standard*** diploma candidates may choose to pursue the (H) or (K) designation, but are not required to do so, and instead have the option of altering the Precalculus course plan as they choose. ***Summa*** students must complete 4 years of mathematics during their high school course of study including Algebra I, Geometry, Algebra II, and Pre-Calculus (or higher). ***Magna*** students must complete 3 years of mathematics during their high school course of study including Algebra I, Geometry, and Algebra II (or higher). ***Standard*** diploma students must complete 2 years of mathematics including Algebra I. Please see below for specific course titles, semester reporting requirements and transcript designations for Precalculus.

REQUIRED SAMPLE WORK:

Designation*	**No Designation**	**K**	**H**
Course Title	**Precalculus**	**Precalculus**	**Precalculus**
Semester 1	1. Any two written samples of work	Please use the Core level Foerster's Precalculus course plan to receive the K designation.	1. Completed Chapter 4 Test 2. Completed Semester 1 Exam
Semester 2	1. Any two written samples of work		1. Completed Chapter 11 Test 2. Completed Semester 2 Exam

***Designation refers to designation type on transcript. K designates a Kolbe Academy Core level course. H designates a Kolbe Academy Honors level course.**

If the student wishes to have the course distinguished on the transcript with an (H) as a Kolbe Academy Honors course, please be sure to send the correct exams and components each semester for verification as specified above. **If no designation on the transcript is desired, parents may alter the lesson plan and any written sample work is acceptable to receive credit for the course each semester.** If you have any questions regarding what is required for the (K) or (H) designations or diploma type status, please contact the academic advisory department at 707-255-6499 ext. 5 or by email at advisors@kolbe.org.

♦♦♦ FIRST SEMESTER ♦♦♦

WEEK 1	
♦♦♦ Chapter 1 ♦♦♦ **Functions and Mathematical Models**	
Students should spend 2 days on Section 1-3.	
1-1	Read Section 1-1. Do problems 1-5.
1-2	Read Section 1-2. Do 1-39 (odd), 40, 41
1-3	Read Section 1-3. Do Reading Analysis, Q1-Q10; and problems 1-6 on day 1. Then do 7-21 on day 2.
1-4	Read Section 1-4. Do Reading Analysis, Q1-Q10, and problems 1, 2, 5, 7, 9, 10, 12-15.

WEEK 2	
♦♦♦ Chapter 1 Cont'd♦♦♦ Functions and Mathematical Models	
1-5	Read Section 1-5. Do Reading Analysis, Q1-Q10, and problems 1, 3-5, 7, 9, 13, 17, 18, 21, 25, 26, 29, 37, 38.
1-6	Read Section 1-6. Do Reading Analysis, Q1-Q10, and problems 1-4, 5, 7, 9-14.
1-8	Read Section 1-8. Do R1-R6, C1.
♦♦♦ Chapter 1 Test ♦♦♦	
♦♦♦ Chapter 2 ♦♦♦ Properties of Elementary Functions	
2-1	Read Section 2-1. Do Reading Analysis and problems 1-4.

WEEK 3	
♦♦♦ Chapter 2 Cont'd ♦♦♦ **Properties of Elementary Functions**	
Students should spend 2 days on Section 2-3.	
2-2	Read Section 2-2. Do Reading Analysis, Q1-Q10, and problems 1-25 (odd)
2-3	Read Section 2-3. Do Reading Analysis, Q1-Q10, and problems 1-23 (odd) on day 1. On day 2, do problems 25-27, 29-32, 35.
2-4	Read Section 2-4. Do Reading Analysis, Q1-Q10, and problems 1-47 (odd).
2-5	Read Section 2-5. Do Reading Analysis, Q1-Q10, and problems 1, 2, 3-49 (odd).