

# Kolbe Academy Home School

## HIGH SCHOOL Precalculus

*Foerster Precalculus: Concepts and Applications, 3<sup>d</sup> Edition*

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**COURSE TITLE:** Precalculus

**COURSE TEXTS:**

- ❖ *Precalculus: Concepts and Applications*, Paul A. Foerster, © 2012, 3<sup>rd</sup> edition (T4093)
- ❖ Solutions Manual, Optional (T4093A)

**COURSE MATERIALS:**

- ❖ Programmable Graphing Calculator, preferably TI-83 or TI-84 model
- ❖ Calculator Programs and other Supplements – download at [www.keymath.com](http://www.keymath.com), scroll down and click on 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.

The Kolbe Core (K) track is recommended for any student who has successfully completed Algebra II (K) or Algebra II/Trig (H). If a student finds the work load unbearable, please contact the advisor department so that suggestions can be made for the student to succeed in this course.

**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

- Chapter 12 – Three Dimensional Vectors (Honors Only)

**Unit 4: Introduction to Discrete and Continuous Mathematics**

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

**DIPLOMA REQUIREMENTS:**

**Summa Cum Laude** diploma candidates are required to follow either the Kolbe Core course (K) or Kolbe Honors course (H) track outlined in this Calculus course plan. **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 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, quarterly reporting requirements and transcript designations for Precalculus.

**REQUIRED SAMPLE WORK:**

Designation*		K	H
Course Title	Precalculus	Precalculus	Precalculus
<b>Quarter 1</b>	1. Any written sample of work	1. Completed Quarter 1 Exam	1. Completed Quarter 1 Exam with Honors sections answered in full 2. One Honors exercise assignment.
<b>Quarter 2</b>	1. Any written sample of work	1. Completed Quarter 2 Exam	1. Completed Quarter 2 Exam with Honors sections answered in full 2. One Honors exercise assignment.
<b>Quarter 3</b>	1. Any written sample of work	1. Completed Quarter 3 Exam	1. Completed Quarter 3 Exam with Honors sections answered in full 2. One Honors exercise assignment.
<b>Quarter 4</b>	1. Any written sample of work	1. Completed Quarter 4 Exam	1. Completed Quarter 4 Exam with Honors sections answered in full 2. One Honors exercise assignment.

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

If the student wishes to have the course distinguished on the transcript with a (K) as a Kolbe Academy Core course or with an (H) as a Kolbe Academy Honors course, please be sure to send the correct exams and components each quarter 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 quarter.** 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](mailto:advisors@kolbe.org).

**COURSE PLAN "AT A GLANCE" OUTLINE:****Core Precalculus (K)****Quarter 1**

Weeks 1-7: Chapters 1, 2, & 4  
 Week 8: Review  
 Week 9: Quarter 1 Exam

**Quarter 2**

Weeks 1-7: Chapters 5, 6, & 7  
 Week 8: Review  
 Week 9: Quarter 2 Exam

**Quarter 3**

Weeks 1-7: Chapters 8, 9, & 10  
 Week 8: Review  
 Week 9: Quarter 3 Exam

**Quarter 4**

Weeks 1-7: Chapters 11, 14 & 15  
 Week 8: Review  
 Week 9: Quarter 4 Exam

**Honors Precalculus (H)****Quarter 1**

Weeks 1-8: Chapters 1, 2, 3 & 4  
 Week 9: Review & Quarter 1 Exam

**Quarter 2**

Weeks 1-7: Chapters 5, 6, & 7  
 Week 8: Review  
 Week 9: Quarter 2 Exam

**Quarter 3**

Weeks 1-8: Chapters 8, 9, 10 & 11  
 Week 9: Review & Quarter 3 Exam

**Quarter 4**

Weeks 1-8: Chapters 12, 14, 15 & 16  
 Week 9: Review & Quarter 4 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 Quarterly 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.

At the end of every chapter, a **Chapter Review** is assigned. The **Chapter Test** that appears at the end of each chapter is assigned during the review and/or test weeks to help prepare the student for the Kolbe Quarterly Exams. However, parents may opt to give these Chapter Tests immediately following the completion of a chapter if they would like to include more test grades in the student's overall grade. Be sure to review which questions are assigned from each test as not all Chapter Tests are always completed in their entirety. The Chapter Test questions, if used as a test, should be completed in less than one hour.

Four **Quarterly Exams** are included at the end of the course plan. Please be sure to utilize the correct exams for your student. There are two sets – a set for students seeking our Kolbe Core (K) designation and a set for those seeking our Honors (H) designation. Each exam has two “sittings”, Part 1 which does not allow the use of the graphing calculator and Part 2 which does allow it. Students should turn in Part 1 before being given Part 2. One hour for each sitting, or two hours total, should be sufficient for completion of the exams. All questions are taken from the test bank provided by the author.

It follows then, that students are expected to be utilizing a programmable **Graphing Calculator**. This skill is especially important now that the use of graphing calculators are 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. If a program is needed for a calculator to complete a problem, students may download them by going to [www.keymath.com](http://www.keymath.com), scrolling down, and clicking on Precalculus. The programs are available for free to students.

◆◆◆ FIRST QUARTER ◆◆◆

WEEK 1			
Core Precalculus (K)		Honors Precalculus (H)	
◆◆◆ Chapter 1 ◆◆◆ Functions and Mathematical Models		◆◆◆ Chapter 1 ◆◆◆ Functions and Mathematical Models	
Students should spend 2 days on Section 1-3.		Students should spend 2 days on Section 1-3.	
1-1	Read Section 1-1. Do problems 1-5.	1-1	Read Section 1-1. Do problems 1-5.
1-2	Read Section 1-2. Do 1-39 (odd), 40, 41	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. On day 2, do problems 7-21.	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.
<div style="border: 1px solid black; padding: 2px; display: inline-block;">Notes</div>			
WEEK 2			
Core Precalculus (K)		Honors Precalculus (H)	
1-4	Read Section 1-4. Do Reading Analysis, Q1-Q10, and problems 1, 2, 5, 7, 9, 10, 12-15	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.
1-5	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.
1-6	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.
1-8	Read Section 1-8. Do R1-R6.	◆◆◆ Chapter 2 ◆◆◆ Properties of Elementary Functions	
		2-1	Read Section 2-1. Do Reading Analysis and problems 1-4.
		2-2	Read Section 2-2. Do Reading Analysis, Q1-Q10, and problems 1-25 (odd)
<div style="border: 1px solid black; padding: 2px; display: inline-block;">Notes</div>			