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COURSE TITLE: Algebra 2

COURSE TEXTS AND RESOURCES:

- *Algebra and Trigonometry: Functions and Applications*, Paul A. Foerster, © 2006
- *Kolbe Academy Graphing Calculator Lab Manual Teacher’s Guide*
- *Math without Borders Foerster Flash Drive Lecture Set* [optional]

COURSE DESCRIPTION:

This course plan includes a one-year course in Algebra 2. Parents should preview the course plans to gain a better understanding of what this course entails.

The Algebra 2 course moves at a very reasonable pace for most high school students. It is meant to be a college preparatory course in nature, taking the student through a great number of Algebra 2 concepts, but also spending a little more time on reviewing Algebra 1 than the honors version of the course. This course of study can be completed by most average students. Upon completion of Algebra 2, students will be ready to tackle any Precalculus course the following year. If a student is struggling with this course, parents may want to call and speak with an advisor, but the following modifications could be made – omitting Chapters 9 & 10.

SCOPE AND SEQUENCE:

Algebra 2

Chapter 1 Preliminary Information
Chapter 2 Functions and Relations
Chapter 3 Linear Functions
Chapter 4 Systems of Linear Equations and Inequalities
Chapter 5 Quadratic Functions and Complex Numbers
Chapter 6 Exponential and Logarithmic Functions
Chapter 7 Rational Algebraic Functions
Chapter 10 Higher-Degree Functions and Complex Numbers
Chapter 9 Quadratic Relations and Systems
Chapter 8 Irrational Algebraic Functions
COURSE PLAN “AT A GLANCE” OUTLINE:

**Semester 1** Material Covered:
- **Week 1** Chapter 1: 1-1 through 1-4
- **Week 2** Chapter 1: 1-5 through 1-7
- **Week 3** Chapter 1/2: 1-8 through 2-2
- **Week 4** Chapter 2: 2-3 through 2-4
- **Week 5** Chapter 2/3: 2-5 through 3-2
- **Week 6** Chapter 3: 3-3 through 3-5
- **Week 7** Chapter 3/4: 3-5 through 4-1
- **Week 8** Chapter 4: 4-2 through 4-4
- **Week 9** Chapter 4: 4-4 through 4-7
- **Week 10** Chapter 4: 4-8 through 4-11
- **Week 11** Chapter 4/5: 4-12 through 5-2
- **Week 12** Chapter 5: 5-3
- **Week 13** Chapter 5: 5-4 through 5-6
- **Week 14** Chapter 5: 5-7 through 5-8
- **Week 15** Chapter 6: 6-1 through 6-3
- **Week 16** Chapter 6: 6-4 through 6-5
- **Week 17** Chapter 6: 6-6; begin Semester 1 Review
- **Week 18** Semester 1 Review

**Exam Schedule:**
- **Chapter 1 Test**
- **Chapter 2 Test**
- **Chapter 3 Test**
- **Chapter 4 Test**
- **Chapter 5 Test**
- **Chapter 6 Test**
- **Chapter 7/10 Test**
- **Chapter 9 Test**
- **Chapter 7 (later sections) Test**
- **Chapter 8 Test**
- **Algebra 2 Semester 1 Exam**

**Semester 2** Material Covered:
- **Week 1** Chapter 6: 6-7 through 6-9
- **Week 2** Chapter 6: 6-10 through 6-13
- **Week 3** Chapter 6: 6-14 through 7-1
- **Week 4** Chapter 7: 7-2 through 7-4
- **Week 5** Chapter 7: 7-4 through 7-6
- **Week 6** Chapter 10: 10-2 through 10-4
- **Week 7** Chapter 7: 7-6 through 7-12
- **Week 8** Chapter 9: 9-1 through 9-4, 9-6
- **Week 9** Chapter 9: 9-4 through 9-6
- **Week 10** Chapter 7: 7-7 through 7-8
- **Week 11** Chapter 7: 7-9
- **Week 12** Chapter 7: 7-10 through 7-11
- **Week 13** Chapter 7/8: 7-12 through 8-2
- **Week 14** Chapter 8: 8-3 through 8-4
- **Week 15** Chapter 8: 8-5 through 8-6
- **Week 16** Chapter 8: 8-7 through 8-8
- **Week 17** Semester 2 Review
- **Week 18** No New Material

**Exam Schedule:**
- **Algebra 2 Semester 2 Exam**

Please note – Chapters 7 and 10 are combined. Parts of chapter 7 are postponed until after Chapter 9.
COURSE PLAN METHODOLOGY:
Mastery in mathematics is achieved through constant practice, so these course plans are written such that math is visited everyday (5 days/week). Each section, when assigned, is meant to be done in 1 day unless otherwise specified in the course plan. It is recommended that students keep to a 5 day/week schedule with mathematics despite the scheduling of their other courses.

The Do These Quickly problems (i.e. Q1-Q10) 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 courses (Geometry, Algebra I, and even basic mathematics) and in later chapters to review concepts learned in earlier portions of the book. 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 quiz grades, if desired.

The Exercise Assignments for each section generally include odd numbered problems. Most odd numbered problems are answered in the back of the student text to aid students in understanding whether they have understood the methodology of the problem.

The Chapter Tests may be found in this course plan. Comprehensive Semester Exams may be found after the Chapter Tests and are to be taken at the end of each semester. Answer keys for both may be found after the tests and exams. A full two hours should be allotted for the student to complete the Semester Exams. Unless otherwise specified, tests and exams are intended to be taken closed book. If the student is not seeking the Kolbe Core (K) designation, then the parent or instructor may provide alternate instructions for the tests and make adjustments to the questions on the tests.

The Kolbe Academy Graphing Calculator Lab Manual (CALC) is written into the course plan as appropriate. Solutions to the graphing calculator problems are provided in the Kolbe Academy Solution Manual to the Graphing Calculator Lab Manual. While it isn’t absolutely essential for students to learn how to use a graphing calculator, it is preferable, especially in courses of Algebra 2 and beyond. Students need to know how to graph things on paper, but it is very useful to use a graphing calculator for the more complex problems where graphing (or other calculations) would bog the student down with unnecessary busy work. Furthermore, the ACT and SAT both allow the use of a graphing calculator, so it can greatly benefit students to know some short cuts to aid them on the math portions of these exams.

The Kolbe Academy Graphing Calculator Lab Manual Teacher’s Guide includes an overview of the functions of the TI-84. Kolbe has also provided the same overview in the Appendix of this course plan. The Texas Instruments (TI) graphing calculators are the most widely used by high school and college students and is the recommended calculator for this course. Note that the TI-83+ or TI-84 is highly recommended as it has far more capabilities than the earlier versions of the graphing calculator. Any special program or function will be outlined in the Texas Instruments Guidebook that comes with your calculator. Note that the TI-85 and TI-86 are set up quite differently from the TI-83, and 84. However, with a little independent study, these versions can also be used easily with the Graphing Calculator Lab Manual.
DIPLOMA REQUIREMENTS:

**Summa Cum Laude** diploma candidates are required to follow the Kolbe Core course (K) track outlined in this course plan. **Magna Cum Laude** and **Standard** diploma candidates may choose to pursue the (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 1, Geometry, Algebra 2, and Pre-Calculus (or higher). **Magna** students must complete 3 years of mathematics during their high school course of study including Algebra 1, Geometry, and Algebra 2 (or higher). **Standard** diploma students must complete 2 years of mathematics including Algebra 1. Please see below for specific course titles, semester reporting requirements for Algebra 2 and Algebra 2 (K).

SEMESTER REPORTING REQUIREMENTS:

<table>
<thead>
<tr>
<th>Designation*</th>
<th>No Designation</th>
<th>K</th>
<th>H</th>
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<tbody>
<tr>
<td>Course Title</td>
<td>Algebra 2</td>
<td>Algebra 2 w/ Trig</td>
<td>Algebra 2 w/ Trig</td>
</tr>
<tr>
<td>Semester 1</td>
<td>Any TWO samples of written and graded work from Semester 1.</td>
<td>1. Completed Chapter 3 Test 2. Completed Semester 1 Exam</td>
<td>Please use the Honor’s level Foerster’s Algebra 2 w/Trigonometry course plan to receive the H designation</td>
</tr>
<tr>
<td>Semester 2</td>
<td>Any TWO samples of written and graded work from Semester 2.</td>
<td>1. Completed Chapter 9 Test 2. Completed Semester 2 Exam</td>
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*Designation refers to designation type on transcript. K designates a Kolbe Academy Core course.

If the student wishes to have the course distinguished on the transcript with a (K) as a Kolbe Academy Core 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) designation 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

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<tr>
<th></th>
<th>Chapter 1</th>
<th>Preliminary Information</th>
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<tbody>
<tr>
<td>1-1</td>
<td>Read Section 1-1. Do problems 1 – 9</td>
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<tr>
<td>1-2</td>
<td>Read Section 1-2. Do problems Q1-Q10, 1-9.</td>
<td></td>
</tr>
<tr>
<td>1-3</td>
<td>Read Section 1-3. Do problems Q1-Q10, 1 – 23 (odd) on day 1. On day 2, do problems 25-42 (all).</td>
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<tr>
<td>1-4</td>
<td>Read Section 1-4. Do problems Q1-Q10, 1 – 33 (odd)</td>
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**Notes**

Some notes on polynomials: Polynomials can have no operations on the variable except for +, –, or x (add, subtract, or multiply). For example, $5x^2 + 8x + 6$ is a polynomial, but $5\sqrt{x} + 8x + 6$ is not. Other examples of polynomials: $2x$ (monomial, first degree); $x^2 + 6$ (binomial, second degree); $5x^4 + 2x + 1$ (trinomial, fourth degree). Note, a monomial is still considered a polynomial.
### WEEK 2

<table>
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<tr>
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<th>Preliminary Information</th>
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<tr>
<td>1-5</td>
<td>Read Section 1-5. Do problems Q1-Q10, 1-21 (odd) on day one. On day 2, do 23-31 (odd), 34, 36 and the lab assignment below.</td>
</tr>
<tr>
<td><strong>CALC</strong></td>
<td>Read Appendix A and Lab Worksheet 1-5.</td>
</tr>
<tr>
<td>1-6</td>
<td>Read Section 1-6. Do problems Q1-Q10, 1-13 (odd), 19a on day 1. On day 2, do 10, 12, 21a, 21b, 23, 31 and lab worksheets below.</td>
</tr>
<tr>
<td><strong>CALC</strong></td>
<td>Do Lab Worksheet 1-6A &amp; 1-6B</td>
</tr>
<tr>
<td>1-7</td>
<td>Read Section 1-7. Do problems Q1-Q10, 1-6, 7. Students should not get bogged down on this section. They are not expected to become expert theorem-provers after this section. But, we want students to be convinced that these properties can be proved.</td>
</tr>
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**Notes**
WEEK 3

- Chapter 1 Preliminary Information
- Chapter 2 Functions and Relations

Students should take two days each to do Section 2-2.

**1-8** Chapter 1 review. Do R1, R2, R3 (a-c), and R4.

- **Chapter 1 Test**

**2-1** Read Section 2-1. Do problems 1-5 and the CALC worksheet below.

<table>
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<th>Lab Worksheet 2-1</th>
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<td><strong>2-2</strong></td>
<td>Read Section 2-2. Do problems 1, 3, 5, 7, 13 &amp; 15 on day one. Do problems 9, 11, 19 on day 2 as well as the lab worksheet below.</td>
</tr>
<tr>
<td><strong>CALC</strong></td>
<td>Lab Worksheet 2-2.</td>
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Notes