

## Chapter 17. Curriculum for Algebra II with Trigonometry

### Part A. Correlation of Objectives with Recommended Textbooks

#### NUMBER STRAND – Algebra II with Trigonometry

Alabama Course of Study	TEAM-Math	AHSGE	Glencoe	IMP Unit	Core Plus
1. Determine the relationships of subsets of complex numbers. Example: using Venn diagrams or tree diagrams to show how subsets of complex numbers are related	N1. Distinguish between various number sets: Complex (Course of Study #1)		5-9 p. 270-275 5-9 p. 280 6-5 p. 315 7-5 p. 374-375	(4) Know How [Days 6-7]	IV-B.Unit 6.Lesson 2.Inv 3 A <i>Complex Solution</i>
2. Simplify expressions involving complex numbers, using order of operations and including conjugate and absolute value. Examples: simplifying $\sqrt{-8}$ , $(4-2i)^2$ , and $\frac{3+i}{3-i}$	N2. Understand and apply concepts and properties of complex numbers (Course of Study #2)		5-9 p. 270-275 6-5 p. 315-316 7-5 p. 372,374-375	(4) Know How [Day 6-7]	IV-B.Unit 6.Lesson 2.Inv 3 A <i>Complex Solution</i>
2. Simplify expressions involving complex numbers, using order of operations and including conjugate and absolute value. 6. Perform operations on functions, including addition, subtraction, multiplication, division, and composition. a. Performing operations on polynomial and rational expressions containing variables 8. Solve systems of linear equations or inequalities in two or three variables using algebraic techniques, including those involving matrices. a. Evaluating the determinant of a 2x2 or 3x3 matrix	N3. Perform operations involving: a. Reals with radicals b. Complex numbers (Course of Study #2) c. Common logarithms d. Rational expressions (Course of Study #6) e. Calculate a determinate for a 2x2 and 3x3 matrix (Course of Study #8)	I-1, I-2, I-3, II-3, III-1, III-2	5-9 p. 270-275 6-5 p. 315-316 7-5 p. 372,374-375 5-2,5-3,5-4 7-7,7-8 p.390-394 7-9 p.399 For more...p.404-405 Getting started p.521 9-1-9-2,9-6 10-2 p.531 Practice quiz p.617 Getting started p.699 13-7 p.749 extra practice p.844,859 3-1 – 3-4 4-5,4-6,4-8,4-8F p.182-191 review p. 212 extra practice p.835	(4) Know How Days 6-7] (3) Meadows or Malls [Days 27-33]	II-A Unit 1, Lessons 1,2,3 IV-A. Unit 3.Lesson 2 <i>Logarithmic Functions</i> IV-B.Unit 6.Lesson 2.Inv 3 A <i>Complex Solution</i> IV-B.Unit 7.Lesson 1 <i>Reasoning with Exponential and Logarithmic Functions</i>

**ALGEBRA STRAND – Algebra II with Trigonometry**

Alabama Course of Study	TEAM-Math	AHSGE	Glencoe	IMP Unit	Core Plus
<p>3. Analyze families of functions, including shifts, reflections, and dilations of <math>y = \frac{k}{x}</math> (inverse variation), <math>y = kx</math> (direct variation/linear), <math>y = [x]</math> (greatest integer), <math>y = x^2</math> (quadratic), <math>y = a^x</math> (exponential), and <math>y = \log_a x</math> (logarithmic).</p> <p>a. Identifying the domain and range of a relation given its graph, a table of values, or its equation, including those with restricted domains</p> <p>b. Identifying real-world situations corresponding to families of functions</p> <p>6. Perform operations on functions, including addition, subtraction, multiplication, division, and composition.</p> <p>a. Constructing graphs by analyzing their functions as sums or differences</p> <p>4. Determine approximate real zeros of functions graphically and numerically and exact real zeros of polynomial functions.</p> <p>a. Using the zero product property, completing the square, and the quadratic formula</p> <p>b. Deriving the quadratic formula</p> <p>5. Identify the characteristics of quadratic functions from their roots, graphs, or equations.</p> <p>a. Generating an equation when given its roots or graph</p> <p>b. Graphing a function when given its equation</p> <p>c. Determining the maximum or minimum values of quadratic functions both graphically and algebraically</p> <p>7. Solve equations, inequalities, and applied problems involving absolute values,</p>	<p>A1. a. Identify and graphically represent: (Course of Study #3)</p> <p><math>y=kx</math>  <math>y=a^x</math>  <math>y=k/x</math>  <math>y = x^2</math>  <math>y=x^3</math>  <math>y=\log_a x</math>  <math>y=[x]</math>  <math>y=\sin x</math>  <math>y=\cos x</math>  <math>y=\tan x</math></p> <p>Constructing graphs by analyzing their functions as sums, differences, or products (Course of Study #6 c)</p> <p>b. Translate, rotate, dilate, and reflect linear, quadratic, cubic, rational, exponential, logarithmic, trigonometric, absolute value, and radical functions. (Course of Study #3)</p> <p>c. Analyze families of functions including:</p> <ul style="list-style-type: none"> <li>• Domain (Course of Study #3)</li> <li>• Range</li> <li>• Restricted domains</li> <li>• Roots (Course of Study #4)</li> <li>• Maximum and minimum values (Course of Study #5)</li> </ul> <p>Given a graph, table of values, or its equation.</p> <p>d. Determine period and amplitude of sine, cosine, and tangent functions from graphs or basic equations. (Course of Study #9)</p> <p>e. Solve equations and inequalities including:</p> <ul style="list-style-type: none"> <li>• Quadratics</li> <li>• Absolute value</li> </ul>	<p>III-1,III-2,VII-8                      III-1,VII-8                      III-1,VII-8                      V-3,VI-1,VII-8                        VI-1,VII-4,VII-8                        IV-2,VII-4,VII-8                        III-1,V-1,VI-1,VII-8                      III-1, VII-8                                  II-2,VII-8</p>	<p>2-1 p.56-61                      2-2, 2-3,2-4                      2-6 p. 93-95                      2-7 p.99-101                      For more... p.104                      4-4 p. 181                      6-1                      6-6P                      6-6                      7-9 p.397-398                      8-1 p.416                      9-4                      9-5                        10-1 p.523,527-528                      10-2                      extra practice p. 830-831                                      7-7 p.383,387                                      6-2 – 6-5                      Getting started p.345                      7-1 - 7-3                      7-4 p. 370                      7-5 – 7-6                      8-7 p.460                      extra practice p.841                        Chapter 6</p>	<p>(4) World of Functions [entire unit]                      (2) All About Alice [Days 10-15]                      (3) Fireworks [entire unit]                      (4) High Dive (3) Meadows or Malls [Days 10-12,20,27-33]</p>	<p>I-A.Unit 2. Inv 2 <i>The Shape of Rules</i> p144-153</p> <p>I-B.Unit 6.Lesson 1 <i>Growth</i> p432-448                      Lesson 2 <i>Decay</i> p448-457</p> <p>IV-A.Unit 1.Lesson 1 <i>Instantaneous Rates of Change</i>                      Lesson 2 <i>Rates of Change for Familiar Functions</i></p> <p>IV-B.Unit 6.Lesson 1 <i>Polynomial Functions</i>                      Lesson 3 <i>Rational Functions</i></p> <p>IV-B. Unit 7.Lesson2 . <i>Reasoning with Trigonometric Functions</i></p> <p>I-A.Unit 3.Lesson 3 <i>Making Connctions</i> p226-234</p> <p>IV-A.Unit3.Lesson2                      IV-B.Unit 7. Lesson 1                      Lesson 3  <i>Solving Trigonometric Equations</i></p>

<p>radicals, and quadratics over the complex numbers, as well as simple trigonometric, exponential, and logarithmic functions.</p> <p>a. Expressing the solution of an equation, inequality, or applied problem as a graph on a number line, or by using set or interval notation</p> <p>8. Solve systems of linear equations or inequalities in two or three variables using algebraic techniques, including those involving matrices.</p> <p>a. Evaluating the determinant of a 2x2 or 3x3 matrix</p> <p>9. Graph trigonometric functions of the form <math>y=a \sin(bx)</math>, <math>y=a \cos(bx)</math>, and <math>y=a \tan(bx)</math>.</p> <p>a. Determining period and amplitude of sine, cosine, and tangent functions from graphs or basic equations</p> <p>b. Determining specific unit circle coordinates associated with special angles</p>	<ul style="list-style-type: none"> <li>• Radical</li> <li>• Exponential</li> <li>• Common logarithmic</li> <li>• Linear systems in 2 and 3 variables, including matrices. (Course of Study # 8)</li> <li>• Develop quadratic formula</li> <li>• Trigonometric</li> <li>• Rational</li> </ul>	<p>I-4,VII-8</p> <p>II-3,V-1,V-4, VI-1,VII-8 VI-1, VII-8</p> <p>III-1,VII-8</p> <p>V-1,V-4,VI-1, VII-8 IV-1,VII-8 VI-1,VII-8 VI-1,VII-8</p> <p>VI-1,VII-8</p> <p>VII-1,VII-8</p>	<p>6-3 p.303, 7-5 374-376</p> <p>3-1 p.110-115</p> <p>3-3 p. 123-127 6-1 – 6-2 p.286-299 6-7 p.335 – 337 7-1 p.348-349 7-2 p.353-358 7-9 p.395-399 8-2 p.420-423 8-3 p.428-429 8-4 p.435-437 10-1 523-524 14-1 762-768 extra practice p. 846-847</p> <p>6-5 p. 313-319 6-6 p. 326-329 review p. 339</p> <p>3-1 – 3-4</p> <p>4-5 p.182-188 4-6 p.189-191 4-8 4-8F review p.212 extra practice p.835 CH 4 matrices 4-8 p 203-207</p> <p>14-1 p762-768 14-2 p 769-776 14-6 p 791-797</p>		
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<p>c. Solving word problems involving real-life situations</p>	<p>A2. Solving word problems involving real life situations. (Course of Study #8)</p>	<p>VI-1, VII-8</p>	<p>This objective is addressed throughout.</p>	<p>Throughout all four years, all units</p>	<p>I-A.Unit 3.Lesson 4                  I-B.Unit 6.Lesson 5                  IV-A. Unit 1.Lesson 1                  Lesson 2</p>
<p>6. Perform operations on functions, including addition, subtraction, multiplication, division, and composition.</p> <p>a. Determining the inverse of a function or a relation</p> <p>b. Performing operations on polynomial and rational expressions containing variables</p> <p>c. Constructing graphs by analyzing their functions as sums, differences, or products</p>	<p>A3. Perform operations on functions:</p> <p>a. +</p> <p>b. -</p> <p>c. x</p> <p>d. /</p> <p>e. Composition</p> <p>f. Inverse</p> <p>g. Factor polynomials including sum and difference of cubes</p>	<p>I-4,VII-8                  VII-8                  VII-8                  VII-8                    VI-1,VII-8                  VII-8                  VII-8                    VII-1,                  VII-8</p>	<p>5-2,5-3,5-4                  7-7 p. 383,387                  7-8 p.390-394                  7-9 p.399                  review and practice                  test p.404-405                  getting started                  p.521                  9-1-9-2,9-6                  10-2 p.531                  11-7 p.617                  getting started                  p.699                  13-7 p.749                  extra practice                  p.844,859</p>	<p>(4) World of Functions [Days 18-26]                  (3) Fireworks [entire unit]                  (4) High Dive</p>	<p>III-A Unit 3, Lessons 1,3                    IV-A.Unit 3.Lesson 1                  Inverses of Functions                    IV-B.Unit 6.Lesson 2  <i>Polynomials and Factoring</i></p>

**GEOMETRY STRAND – Algebra II with Trigonometry**

Alabama Course of Study	TEAM-Math	AHSGE	Glencoe	IMP Unit	Core Plus
12. Verify simple trigonometric identities using Pythagorean and/or reciprocal identities. Example: verifying $\cos^2 \alpha + \tan^2 \alpha \cos^2 \alpha = 1$	G5. Verify simple trigonometric identities using Pythagorean and/or reciprocal identities. (Course of Study #12)	VII-1,VII-8	14-3 p 777-781 14-4 p 782-785 14-5 p 786-790 14-6 p 791-797	(4) High Dive [ Day 18-20]	III-A Unit 3, Lesson 5  IV-B.Unit 7.Lesson 2  Lesson 3
10. Solve general triangles, mathematical problems, and real-world applications using the Law of Sines and the Law of Cosines. a. Deriving formulas for Law of Sines and Law of Cosines b. Determining area of oblique triangles 11. Define the six trigonometric functions using ratios of the sides of a right triangle, coordinates on the unit circle, and the reciprocal of other functions.	G6. Solve general triangles, mathematical problems, and real-world applications using the Law of Sines and the Law of Cosines. a. Deriving formulas for Law of Sines and Law of Cosines b. Determining area of oblique triangles (Course of Study #10) G7. Define the six trigonometric functions using ratios of the sides of a right triangle, coordinates on the unit circle, and the reciprocal of other functions. (Course of Study #11)	VII-1,VII-4, VII-8  VII-1,VII-4 VII-1,VII-4 VII-1,VII-2 VII-1	13-4 p 725-732 13-5 p 733-738  13-1 p 700-708 13-2 p 709-715 13-3 p 717-724 13-6 p 739-745	(4) Know How [Days 2-3] (2) Do Bees Build It (4) High Dive [Days 1-20] (4) As the Cube Turns [Days 13-16]	III-A Unit 1, Lesson 2 II-B Unit 6, Lessons 2,3  IV-B.Unit 7. Lesson 2

**MEASUREMENT STRAND – Algebra II with Trigonometry**

Alabama Course of Study	TEAM-Math	AHSGE	Glencoe	IMP Unit	Core Plus
	M1. Analyze various problems to determine which measurement and tools are appropriate in relation to Algebra II topics, including analyzing accuracy and approximate error.			(2) Do Bees Build [ Day 19 ]	

**DATA ANALYSIS & PROBABILITY STRAND - Algebra II with Trigonometry**

Alabama Course of Study	TEAM-Math	AHSGE	Glencoe	IMP Unit	Core Plus
13. Use different forms of representation to compare characteristics of data gathered from two populations. a. Evaluating the appropriateness of the design of an experimental study b. Describing how sample statistics reflect values of population parameters	D2. Use different forms of representation to compare characteristics of data gathered from two populations. a. Evaluating the appropriateness of the design of an experimental study b. Describing how sample statistics reflect values of population parameters (Course of Study #13)	VII-8	12-9 p 682-685	(4) The Pollster’s Dilemma[Days 1-3]	III-A Unit 2, Lessons 2,3 III-B Unit 5, Lessons 1,2 IV-A.Unit 5. <i>Binomial Distributions and Statistical Inference</i>
14. Determine an equation of linear regression from a set of data. a. Examining data to determine if a linear, quadratic, or exponential relationship exists and to predict outcomes	D3. Determine an equation of linear regression from a set of data. a. Examining data to determine if a linear, quadratic, or exponential relationship exists and to predict outcomes (Course of Study #14)	VII-8	2-5 p 81-88 6-2 F p300 7-2F p 359	(4) The Pollster’s Dilemma [Day 10]	III-B Unit5, Lessons 1,2 I-A.Unit 3. Lesson 1.Inv 3 p165-181 Lesson 2 p 197-200 Lesson 4 I-B.Unit 5.Inv 1 p 327-329; 335 I-B.Unit 6 <i>Exponential Models</i> p 432-483 Lesson 4 <i>Exponential Patterns in Data</i> p 463-476 I-B.Capstone.Inv6 p 538-541 IV-A.Unit 1.Lesson 1 Lesson 2
15. Calculate probabilities of events using the laws of probability. a. Using permutations and combinations to calculate probabilities b. Calculating conditional probability c. Calculating probabilities of mutually exclusive events, independent events, and dependent events	D5. Calculate probabilities of events using the laws of probability. a. Using permutations and combinations to calculate probabilities b. Calculating conditional probability c. Calculating probabilities of mutually exclusive events, independent events, and dependent events (Course of Study #15)	VII-6,VII-8 VII-6 VII-6	12-2 p 638-643 12-3 p 644-650 12-4 p 651-657 12-5 p 658-663	(3) Pennant Fever [entire unit] (4) The Pollster’s Dilemma [Days 3-7]	II-B Unit 7 I-B.Unit 7.Lesson 1 p 484-497 Lesson 2 p 509 # 4 IV-A.Unit 4.Lesson 1 <i>Methods of Counting</i> Lesson 2 <i>Counting Throughout Mathematics</i>

**Part B. Suggested Sequence of Instructions**

The 9-12 curriculum has been organized into instructional units for each course. The pacing of the units is left up to individual schools and teachers, although some units build on content presented in other units.

Each unit represents a ‘big idea’ to be emphasized. These content objectives are the focus of each unit.

Some objectives are found in more than one unit. When this occurs, it usually means that the objective needs to be expanded to demonstrate more challenging content. However in all courses, the Data Analysis objectives can be incorporated into several units. This signifies continual exposure to these objectives through daily classroom routines.

The resource list for each unit references the TEAM-Math adopted textbooks. They are *Glencoe* and *Interactive Mathematics Program (IMP)*. Some schools or teachers may also use the *CORE-Plus* texts. Teachers cannot use all the resources listed, so they must choose the best ones for them. All of the *IMP* units are referenced, although most adoptions only include the two units recommended in the TEAM-Math Textbook Review.

**Suggested Pacing Guide**

<b>Choice A</b>	<b>Choice B</b>
Trigonometric Functions	Linear Functions and Equations
Linear Functions and Equations	Solving Linear Systems/Inequalities
Solving Linear Systems/Inequalities	Quadratic Functions ( <i>Fireworks</i> )
Quadratic Functions ( <i>Fireworks</i> )	Polynomial Functions
Polynomial Functions	Operations on Functions
Operations on Functions	Trigonometric Functions
Rational Functions	Rational Functions
Radical Functions	Finite Math (Pennant Fever)
Exponential and Logarithmic Functions	Radical Functions
Finite Math ( <i>Pennant Fever</i> )	Exponential and Logarithmic Functions

**UNIT: Linear Functions and Equations**

Topics	AL COS	TEAM-Math	Glencoe	IMP
Statistics Project (Including a review on slope, writing equation of lines, graphing linear equation)	13,14	DA2, DA3	12-9 p 682-685	
Solving absolute value equations and inequalities	7b	A1Eb	1-4 p 28 – 32 1-5 p 33 – 39 1-6 p 40 - 46	
Graphing the greatest integer function	3	A1Af, A1B , A1C	2-6 p 93 - 95	

**UNIT: Solving Linear Systems (Including Inequalities)**

Topics	AL COS	TEAM-Math	Glencoe	IMP
Solving linear systems by graphing	8	A1Ef	3-1 pp110 - 115	
Solving linear systems using substitution and elimination	8	A1Ef	3-2 p 116 - 121	
Solving linear systems in three variables	8	A1Ef	3-5 p 138 - 144	
Solving linear systems using matrices (Cramer’s Rule, too)	8	A1Ef	4-5 p 182 – 188 4-6 p 189 – 191 4-7 p 195 – 201 4-8 p202 - 204	
Solving systems of linear inequalities	8	A1Ef	3-4 p129 – 134	
Real-world applications involving linear systems	8	A2	3 -1 thru 3 - 5	

**UNIT: Quadratic Functions**

Topics	AL COS	TEAM-Math	Glencoe	IMP
Graphing quadratic functions	3, 5	A1A, A1B, A1C	6-1 p 286 – 293 6-6 p 322 – 328 p 320 - 321	(3) Fireworks [entire unit]
Factoring		A3	5-4 p 239 - 244	
Solving quadratic equations and inequalities by graphing	7	A1Ea	6-2 p 294 – 300 6-7 p 329 - 335	(3) Fireworks [entire unit]
Solving quadratic equations and inequalities by factoring	7	A1Ea	6-3 p 301 - 305	(3) Fireworks [entire unit]
Solving quadratic equations and inequalities by completing the square	7	A1Ea	6-4 p 306 – 312	(3) Fireworks [entire unit]
Solving quadratic equations and inequalities using the quadratic formula – derive the quadratic formula	7	A1Ea	6-5 p 313 - 319	(3) Fireworks [entire unit]
Perform operations on complex numbers	1, 2	N3b	5-9 p. 270-275	(3) Fireworks [entire unit]

			5-9 p. 280 6-5 p. 315 7-5 p. 374-375	
Generate a quadratic equation given a graph or roots	5a		p 303	(3) Fireworks [entire unit]
Quadratic regression from a data set	14	DA3	p 300	

**UNIT: Polynomial Function**

Topics	AL COS	TEAM-Math	Glencoe	IMP
Identifying and describing polynomial functions	3	A1Ad, A1B, A1C	7-1, p 344 – 352 7-2 p 353 - 358	
Determining roots of polynomial functions – approximating roots	4	A1C	7-2 p 353 - 358	
Determining roots of polynomial functions – exact roots, Descartes rule of signs, rational zero theorem, long and synthetic division	4	A1C	7-3 p 363 – 364 7-4 p 364 – 370 7-5 p 371 – 377 7-6 p 378 - 382	

**UNIT: Operations on Functions**

Topics	AL COS	TEAM-Math	Glencoe	IMP
Add, subtract, multiply, and divide functions – including polynomial and rational functions	6	N3d A3	7-7 p 383 -389 9-1 p 472 – 478 9-2 p 479 - 484	
Inverse functions	6	A3	7-8 p 390 – 394	
Composition of functions	6	A3	7-8 p 390 – 394	

**UNIT: Rational Functions**

Topics	AL COS	TEAM-Math	Glencoe	IMP
Graphing rational functions – including horizontal and vertical asymptotes, and holes	3	A1Aa,c; A1B; A1C	9-3 p 485 - 491 9-4 p 492 - 498	
Solving rational equations and inequalities	7	A1E	9-6 p 505 -512	
Extension – constructing graphs	6c	A1Aj		

**UNIT: Radical Functions**

Topics	AL COS	TEAM-Math	Glencoe	IMP
Graphing radical functions	3	A1A, A1B, A1C	7-9 p 395 - 399	
Solving radical equations and inequalities	7	A1Ec	5-8 p 263 – 270 7-9 p 395 - 399	

**UNIT: Trigonometric Functions**

Topics	AL COS	TEAM-Math	Glencoe	IMP
Solving triangles	10, 11	G6, G7	13-4 p 725-732 13-5 p 733-738  13-1 p 700-708 13-2 p 709-715 13-3 p 717-724 13-6 p 739-745	
Graphing trigonometric functions	9	A1Ag, h, i; A1B; A1C; A1D	14-1 p 762 – 768 14-2 p 769 - 776	
Verifying trigonometric identities	12	G5	14-3 p 777-781 14-4 p 782-785 14-5 p 786-790 14-6 p 791-797	
Solving trigonometric equations	7	A1E	14-7 p 799 - 804	

**UNIT: Exponential & Logarithmic Functions**

Topics	AL COS	TEAM-Math	Glencoe	IMP
Graphing exponential and logarithmic functions	3	A1Ab,e; A1B; A1C	10-1 p 523 - 530 10-2 p 531 - 540	
Rational exponents			5-7 p 257 - 262	
Evaluating logarithms		N3c	10-2 p 531 – 540	
Solving exponential equations	7a	A1Ed, e	P 552 – 553 10-1 p 523 - 530	

**UNIT: Finite Math**

Topics	AL COS	TEAM-Math	Glencoe	IMP
Probability	15	DA5	12-2 p 638-643 12-3 p 644-650 12-4 p 651-657 12-5 p 658-663	(3) Pennant Fever [entire unit]