A Correlation of

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Integrated CME Project
Mathematics II
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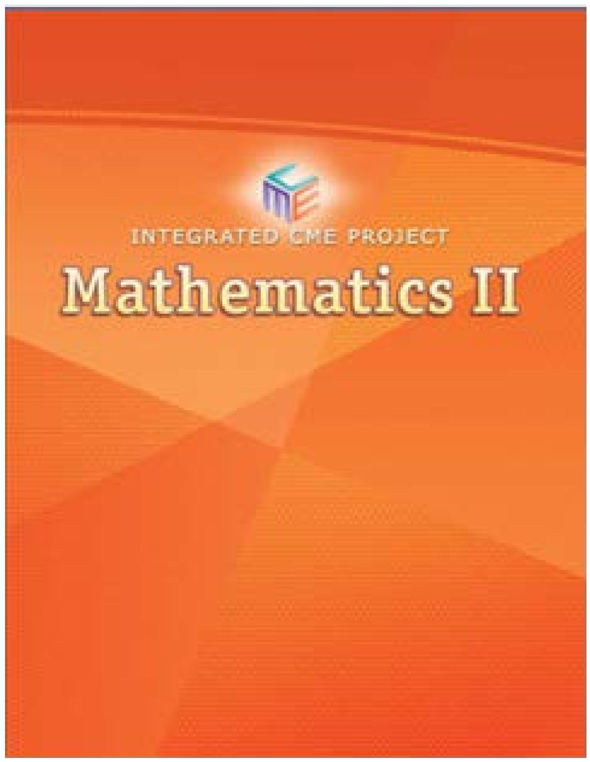

to the

Common Core State Standards for Mathematics

Appendix A, Integrated Pathway Mathematics II

High School

A Correlation of Pearson Integrated CME Project Mathematics II to the Common Core State Standards for Mathematics Appendix A Integrated Pathway: Mathematics II

Introduction

This document demonstrates how ***Pearson Integrated CME Project* Mathematics II ©2013** meets the standards of the *Common Core State Standards for Mathematics, Appendix A, Integrated Pathway Mathematics II.* Correlation references are to the pages of the Student and Teacher's Editions.

The ***Integrated CME Project*** is an NSF-funded core mathematics program that was built for the Integrated Pathway of the Common Core State Standards. It includes content from algebra, geometry, as well as Precalculus concepts. The program's proven-effective pedagogy provides the focus, coherence, and rigor necessary to ensure today's students master the challenging new Common Core State Standards. The program also incorporates technology and hands-on projects and activities to engage today's digital students in deep mathematical learning.

Integrated CME Content includes Mathematics I, Mathematics II, and Mathematics III. Each course is focused on big ideas. ***Integrated CME Project*** is organized by coherent chapters. Chapters are comprised of investigation. Each Investigation is then composed of 3-6 lessons. The basic mathematics of each Investigation is accessible to all, and each Investigation can ultimately challenge the best students. The students work from a more informal to formal understanding of the mathematical topic explored in that particular chapter. The Investigation wrap-up, called Mathematical Reflections, provides an opportunity to review and summarize at the end of the chapter—good preparation for the Next-Generation assessments that will require students to justify their conclusions and mathematical understandings in writing. A Chapter Project extends student understanding by presenting challenges and highlighting connections to additional topics—projects are great preparation for performance tasks that will be on the upcoming Next-Generation assessments.

This document demonstrates the high degree of success students will achieve by using ***Pearson Integrated CME Project* Mathematics I-III.**

A Correlation of Pearson Integrated CME Project Mathematics II
to the Common Core State Standards for Mathematics
Appendix A Integrated Pathway: Mathematics II

Table of Contents

A Correlation of Pearson Integrated CME Project Mathematics II
to the Common Core State Standards for Mathematics
Appendix A Integrated Pathway: Mathematics II

Clusters with Instructional Notes	Common Core State Standards for Mathematics Integrated Pathway: Mathematics II	Integrated CME Project, ©2013 Mathematics II
Unit 1: Extending the Number System		
Extend the properties of exponents to rational exponents.	N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.	**SE/TE:** 31 (#3), 44 (#4), 45 (#11), 49 (#2-3), 50, 51 (#4), 52 (#8-11), 53 (#13-14, 19), 54-58
	N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.	**SE/TE:** 16-20, 50 (Example 1), 53 (#14), 54-56, 57 (#9, 13), 58 (#16), 59 (#2, 5), 60 (#6)
Use properties of rational and irrational numbers. *Connect N.RN.3 to physical situations, e.g., finding the perimeter of a square of area 2.*	N.RN.3 Explain why sums and products of rational numbers are rational, that the sum of a rational number and an irrational number is irrational, and that the product of a nonzero rational number and an irrational number is irrational.	**SE/TE:** 24-25, 26 (#6-8), 27 (#11-12, 14-15)
Perform arithmetic operations with complex numbers. *Limit to multiplications that involve i2 as the highest power of i.*	N.CN.1 Know there is a complex number *i* such that *i2* = −1, and every complex number has the form *a* + *bi* with *a* and *b* real.	**SE/TE:** 216, 227 (#4, 6)
	N.CN.2 Use the relation *i2* = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	**SE/TE:** 216-218, 219-221, 222, 227 (#5)
Perform arithmetic operations on polynomials. *Focus on polynomial expressions that simplify to forms that are linear or quadratic in a positive integer power of x.*	A.APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	**SE/TE:** 92-97, 105-109

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Unit 2: Quadratic Functions and Modeling		
Interpret functions that arise in applications in terms of a context. *Focus on quadratic functions; compare with linear and exponential functions studied in Mathematics I.*	F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*★	**SE/TE:** 177, 179-181, 181 (#1-2), 182 (#6-7, 10-12), 184-188, 189-191, 192-197, 197-200, 201, 316-320, 335 (#1-5), 344 (#4, 6), 345, 353 (#6), Honors Appendix: 923, 939 (#6), 940-946, 947-951
	F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. ★	**SE/TE:** 177-181, 182 (#8, 10), 280 (#1-2, 6), 281 (#9, 11-12), 302-303, 347-348, 352 (#1)
	F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. ★	For related content, please see: **SE/TE:** 246-251, 252-258, 342-343

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Analyze functions using different representations. *For F.IF.7b, compare and contrast absolute value, step and piecewise-defined functions with linear, quadratic, and exponential functions. Highlight issues of domain, range and usefulness when examining piecewise-defined functions. Note that this unit, and in particular in F.IF.8b, extends the work begun in Mathematics I on exponential functions with integer exponents. For F.IF.9, focus on expanding the types of functions considered to include, linear, exponential, and quadratic.* *Extend work with quadratics to include the relationship between coefficients and roots, and that once roots are known, a quadratic equation can be factored.*	F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ★	For related content, please see: **SE/TE:** 177-182, 183-188, 189 (#2-3), 190 (#9), 191 (#11-12), 192-195, 199 (#8, 10), 335, 336(#16), 337 (#18-22), 338-343, 344 (#4-6), 345, 347-355, 356-364, Honors Appendix: 941-946, 947-951
	a. Graph linear and quadratic functions and show intercepts, maxima, and minima.	**SE/TE:** 183-188, 189-191, 337 (#16), 345 (#8), 347-351, 353 (#7), 354 (#12), 356-357, 361 (#1-2, 4), 362 (#9), 364 (#18)
	b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	**SE/TE:** 300-304, 306, 307 (#9-10), 308 (#1), 335 (#6-8), 337 (#18)
	F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	**SE/TE:** 65, 67, 74 (#14), 279, 307 (#6), 308 (#12-13)
	a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.	**SE/TE:** 133 (#1), 136 (#9), 139 (#5), 141 (#14), 177-181, 182 (#6-12), 183-188, 189 (#1-2, 4), 190 (#5-6, 9), 191 (#12), 193 (#1-3), 197 (#4)
	b. Use the properties of exponents to interpret expressions for exponential functions.	**SE/TE:** 324-327, 328 (#1), 329 (#7), 331 (#13-15)
	F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	**SE/TE:** 177-179, 181 (#1-2), 182 (#11-12), 183-188, 189-191, 192-200, 238-241, 242-243

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Build a function that models a relationship between two quantities. *Focus on situations that exhibit a quadratic or exponential relationship.*	F.BF.1 Write a function that describes a relationship between two quantities. ★	**SE/TE:** 238-239, 241, 242 (#1-3), 244 (#11-12), 246-248, 249-250, 251 (#18), 280 (#7), 281 (#8-9), 282 (#15), 321 (#2-3), 322 (#13), 328 (#1-3, 5), 329 (#7), 330 (#12), 331 (#13-15)
	a. Determine an explicit expression, a recursive process, or steps for calculation from a context.	**SE/TE:** 235-237, 238-239, 241, 244 (#11-12), 322 (#13), 329 (#7), 331 (#13-15)
	b. Combine standard function types using arithmetic operations.	For related content, please see: **SE/TE:** 274-279, 280 (#2), 281 (#11)
Build new functions from existing functions. *For F.BF.3, focus on quadratic functions and consider including absolute value functions. For F.BF.4a, focus on linear functions but consider simple situations where the domain of the function must be restricted in order for the inverse to exist, such as f(x) = x2, x>0.*	F.BF.3 Identify the effect on the graph of replacing *f(x)* by *f(x) + k, k f(x), f(kx)*, and *f(x + k)* for specific values of *k* (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.*	**SE/TE:** 335, 337 (#17, 20, 22), 344-345, 347-351, 352 (#1), 353 (#5, 9), 356-364
	F.BF.4 Find inverse functions.	**SE/TE:** 293-294, 295 (#1), 297 (#9), 298 (#14)
	a. Solve an equation of the form *f(x) = c* for a simple function *f* that has an inverse and write an expression for the inverse. *For example, f(x) = 2 x3 or f(x) = (x+1)/(x-1) for x ≠ 1.*	For related content, please see: **SE/TE:** 617, 618 (#4), 623 (#5, 7), 675-679, 787-793

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Construct and compare linear, quadratic, and exponential models and solve problems. *Compare linear and exponential growth studied in Mathematics I to quadratic growth.*	F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	For related content, please see: **Integrated CME Project Mathematics I** **SE/TE:** 462-463, 464 (#3-4), 465 (#1-4), 466 (#7) **Integrated CME Project Mathematics III** **SE/TE:** 618-619
Unit 3: Expressions and Equations		
Interpret the structure of expressions. *Focus on quadratic and exponential expressions. For A.SSE.1b, exponents are extended from the integer exponents found in Mathematics I to rational exponents focusing on those that represent square or cube roots.*	A.SSE.1 Interpret expressions that represent a quantity in terms of its context. ★	**SE/TE:** 65-67, 68-71, 72-73, 74 (#13), 89-91, 99-101, 102-104, 105-109, 117-120, 121 (#1-3, 5), 122-124, 167-169, 170-171, 324-327, 328-331
	a. Interpret parts of an expression, such as terms, factors, and coefficients.	**SE/TE:** 65 (#1), 67 (#13, 15), 68-71, 72, 73 (#6-8), 74 (#14-16), 89 (#3), 90 (#8), 91 (#11, 14), 99-101, 102-104, 105-109, 117-120, 121 (#1-3, 5), 122, 123 (#13, 15, 17), 124
	b. Interpret complicated expressions by viewing one or more of their parts as a single entity.	**SE/TE:** 81, 83 (#2), 84 (#5), 125-129, 130-132, 167-169, 170-171
	A.SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see *x4 – y4* as *(x2)2 – (y2)2*, thus recognizing it as a difference of squares that can be factored as *(x2 – y2)(x2 + y2).*	**SE/TE:** 35 (#2), 36, 37-38, 39-41, 42-43, 44-45, 46 (#13-16), 54-57, 65 (#1), 66 (#6), 67 (#13, 15), 68-71, 72-74, 75-78, 79, 80 (#11-12), 113, 116 (311, 14-15), 117-119, 121, 122-124, 125-129, 130-132, 133-138, 139 (#3, 5-7), 140-141, 216-221, 222-226

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Write expressions in equivalent forms to solve problems. *It is important to balance conceptual understanding and procedural fluency in work with equivalent expressions.* *For example, development of skill in factoring and completing the square goes hand-in-hand with understanding what different forms of a quadratic expression reveal.*	A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★	**SE/TE:** 36 (#6-7), 37-38, 39 (#1, 6-7), 40 (#13-14, 16), 41 (#22), 42-44, 45 (#11), 46 (#13-15), 54-56, 58 (#16), 65 (#1), 66 (#6), 67 (#10), 70-71, 75-78, 79 (#3), 80 (#12), 81, 83 (#2), 84-86, 117-120, 121 (#1), 122 (#10), 124 (#25), 125-129, 131 (#7-8), 133-138, 139 (#7)
	a. Factor a quadratic expression to reveal the zeros of the function it defines.	**SE/TE:** 75-78, 79 (#2-3, 5, 7), 82, 83 (#3e), 117-118, 123 (#13) 124 (#23), 126-127, 130 (#3), 133, 138 (#1), 139 (#5), 141 (#14, 19), 177-182
	b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	**SE/TE:** 133-138, 139 (#5), 141 (#14, 20), 177-182, 185-186, 189, 190
	c. Use the properties of exponents to transform expressions for exponential functions.	**SE/TE:** 314 (#13), 316-318, 321 (#5, 9), 322 (#16), 323 (#21), 326-327, 329 (#7), 331 (14), 333 (#5)
Create equations that describe numbers or relationships. *Extend work on linear and exponential equations in Mathematics I to quadratic equations. Extend A.CED.4 to formulas involving squared variables.*	A.CED.1 Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*	**SE/TE:** 98 (#10), 123 (#12), 162-165, 175, 176 (#4), 182 (#8, 10), 189 (#4), 190 (#5-7), 322 (#13), 329 (#7), 331 (#13-15)
	A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	**SE/TE:** 175, 176 (#4)
	A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	For related content, please see: **SE/TE:** 67 (#7), 73 (#9-12), 74 (#13), 79 (#1), 80 (#8), 84 (#7-8)

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A Correlation of Pearson Integrated CME Project Mathematics II
to the Common Core State Standards for Mathematics
Appendix A Integrated Pathway: Mathematics II

Clusters with Instructional Notes	**Common Core State Standards for Mathematics Integrated Pathway: Mathematics II**	**Integrated CME Project, ©2013 Mathematics II**
Solve equations and inequalities in one variable. *Extend to solving any quadratic equation with real coefficients, including those with complex solutions.*	A.REI.4 Solve quadratic equations in one variable.	**SE/TE:** 135 (#5), 138 (#1), 139 (#5), 140 (#12), 141 (#14, 19), 142 (#21), 143 (#5), 153-154, 155-161, 162-163, 166 (#5), 203, 221 (#15)
	a. Use the method of completing the square to transform any quadratic equation in *x* into an equation of the form *(x – p)2 = q* that has the same solutions. Derive the quadratic formula from this form.	**SE/TE:** 133-141, 142 (#21-22), 153, 160 (#1-8, 11), 161 (#27)
	b. Solve quadratic equations by inspection (e.g., for *x2* = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as *a* ± *bi* for real numbers *a* and *b*.	**SE/TE:** 123 (#13), 124 (#23), 130 (#3), 132 (#13), 133-141, 142 (#22), 153, 155-161, 166 (#5), 205-206, 207, 208 (#13-14), 214 (#12), 205 (#13-15), 220 (#11)
Use complex numbers in polynomial identities and equations. *Limit to quadratics with real coefficients.*	N.CN.7 Solve quadratic equations with real coefficients that have complex solutions.	For related content, please see: **SE/TE:** 213 (#3), 214 (#12), 220 (#7-8), 221 (#15), Honors Appendix: 875, 876 (#1, 4-6)
	N.CN.8 Extend polynomial identities to the complex numbers.	For related content, please see: **SE/TE:** 221 (#14)
	N.CN.9 Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.	For related content, please see: **SE/TE:** 221 (#14-15), Honors Appendix: Historical Perspective: 877

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Solve systems of equations. *Include systems consisting of one linear and one quadratic equation. Include systems that lead to work with fractions. For example, finding the intersections between x2 + y2 = 1 and y = (x+1)/2 leads to the point (3/5, 4/5) on the unit circle, corresponding to the Pythagorean triple 32 + 42 = 52.*	A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.	For related content, please see: **Integrated CME Project Mathematics I** For related content, please see: **SE/TE:** 217 (#5-6), 218 (#9), 321 (#4), 324-325, 328 (#9), 341 (Example 2)
Unit 4: Applications of Probability		
Understand independence and conditional probability and use them to interpret data. Build on work with two-way tables from Mathematics I Unit 4 (S.ID.5) to develop understanding of conditional probability and independence.	S.CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”).	**SE/TE:** 379, 381-387
	S.CP.2 Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	**SE/TE:** 384-385
	S.CP.3 Understand the conditional probability of *A* given *B* as *P(A* and *B)/P(B)*, and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*.	**SE/TE:** 388-390, 391 (#8-9), 391 (Theorem 5.2; #13), 392, 394 (#11), 395-400

Clusters with Instructional Notes	**Common Core State Standards for Mathematics Integrated Pathway: Mathematics II**	**Integrated CME Project, ©2013 Mathematics II**
(Continued) Understand independence and conditional probability and use them to interpret data. Build on work with two-way tables from Mathematics I Unit 4 (S.ID.5) to develop understanding of conditional probability and independence.	S.CP.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.	**SE/TE:** 393 (#5, 7), 394 (#8-9), 395-400
	S.CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.	**SE/TE:** 389-391, 392-394, 395-400
Use the rules of probability to compute probabilities of compound events in a uniform probability model.	S.CP.6 Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A*, and interpret the answer in terms of the model.	**SE/TE:** 388 (#1), 391 (#10-13), 392 (#3, 4), 393 (#7), 394 (#8-10), 395-400
	S.CP.7 Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.	**SE/TE:** 381-387
	S.CP.8 Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = P(A)P(B\|A) = P(B)P(A\|B)$, and interpret the answer in terms of the model.	**SE/TE:** 388-394, 395-400
	S.CP.9 Use permutations and combinations to compute probabilities of compound events and solve problems.	**SE/TE:** 386 (#4), 401-406, 407-414

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Use probability to evaluate outcomes of decisions. *This unit sets the stage for work in Mathematics III, where the ideas of statistical inference are introduced. Evaluating the risks associated with conclusions drawn from sample data (i.e. incomplete information) requires an understanding of probability concepts.*	S.MD.6 Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).	**SE/TE:** 379-380, 381-387
	S.MD.7 Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).	**SE/TE:** 415-422
Unit 5: Similarity, Right Triangle Trigonometry, and Proof		
Understand similarity in terms of similarity transformations.	G.SRT.1 Verify experimentally the properties of dilations given by a center and a scale factor.	For related content, please see: **SE/TE:** 561-564, 565-571
	a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.	For related content, please see: **Integrated CME Project Mathematics I** **SE/TE:** 565-571
	b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	For related content, please see: **SE/TE:** 536-543, 565-571
	G.SRT.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	**SE/TE:** 547, 549-556, 561-562, 565-571, 594, 595-596, 597 (#1), 598-599

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Clusters with Instructional Notes	Common Core State Standards for Mathematics Integrated Pathway: Mathematics II	Integrated CME Project, ©2013 Mathematics II
(Continued) Understand similarity in terms of similarity transformations.	G.SRT.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	**SE/TE:** 600-604, 605-606
Prove geometric theorems. *Encourage multiple ways of writing proofs, such as in narrative paragraphs, using flow diagrams, in two-column format, and using diagrams without words. Students should be encouraged to focus on the validity of the underlying reasoning while exploring a variety of formats for expressing that reasoning. Implementation of G.CO.10 may be extended to include concurrence of perpendicular bisectors and angle bisectors as preparation for G.C.3 in Unit 6.*	G.CO.9 Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*	**SE/TE:** 455-461, 462-468, 469-470, 472 (#1-2), 475 (#14), 499-504
	G.CO.10 Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*	For related content, please see: **SE/TE:** 430 (#3-4), 433 (#16), 438, 471, 484 (#5), 485 (#6), 490 (#1-2), 491, 492 (#2), 493 (#4), 499-504, 521-523, 722-727
	G.CO.11 Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*	**SE/TE:** 433 (#17), 486 (#9), 515-520, 521-523

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Prove theorems involving similarity.	G.SRT.4 Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*	**SE/TE:** 580-581, 583, 584 (#1), 587-590, 716-721
	G.SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	**SE/TE:** 428-430, 431-433, 595-596, 598-599, 600-604, 605-606, 707-709, 710-715, 716-721
Use coordinates to prove simple geometric theorems algebraically.	G.GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	For related content, please see: **SE/TE:** 560 (#11-13), 728-734, 769-770
Define trigonometric ratios and solve problems involving right triangles.	G.SRT.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	**SE/TE:** 746-752, Honors Appendix: 907-912
	G.SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.	**SE/TE:** 746-752, Honors Appendix: 909-910, 911 (#8-10)
	G.SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	**SE/TE:** 741-745, 746-752, 753-759, Honors Appendix: 907-912

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Prove and apply trigonometric identities. *In this course, limit θ to angles between 0 and 90 degrees. Connect with the Pythagorean theorem and the distance formula. A course with a greater focus on trigonometry could include the (+) standard F.TF.9: Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems. This could continue to be limited to acute angles in Mathematics II.* *Extension of trigonometric functions to other angles through the unit circle is included in Mathematics III.*	F.TF.8 Prove the Pythagorean identity sin2(θ) + cos2(θ) = 1 and use it to find sin (θ), cos (θ), or tan (θ), given sin (θ), cos (θ), or tan (θ), and the quadrant of the angle.	For related content, please see: **SE/TE:** 928
Unit 6: Circles With an Without Coordinates		
Understand and apply theorems about circles.	G.C.1 Prove that all circles are similar.	For related content, please see: **SE/TE:** 654
	G.C.2 Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.*	**SE/TE:** 441, 663-665, 666-668, 669 (#1), 674-679, 686-692
	G.C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	**SE/TE:** 665, 680-682, 683 (#3), 684 (#4-5), 685 (#11)
	G.C.4 Construct a tangent line from a point outside a given circle to the circle.	**SE/TE:** 686-689, 690 (#3)

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Find arc lengths and areas of sectors of circles. *Emphasize the similarity of all circles. Note that by similarity of sectors with the same central angle, arc lengths are proportional to the radius. Use this as a basis for introducing radian as a unit of measure. It is not intended that it be applied to the development of circular trigonometry in this course.*	G.C.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	**SE/TE:** 647 (#2-3), 654-657, 658 (#1-3)
Translate between the geometric description and the equation for a conic section. *Connect the equations of circles and parabolas to prior work with quadratic equations. The directrix should be parallel to a coordinate axis.*	G.GPE.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.	**SE/TE:** 802-803, 825 (#2), 827 (#8)
	G.GPE.2 Derive the equation of a parabola given a focus and directrix.	**SE/TE:** Honors Appendix: 968, 970 (#9), 971-972, 978 (#6-7)
Use coordinates to prove simple geometric theorems algebraically. *Include simple proofs involving circles.*	G.GPE.4 Use coordinates to prove simple geometric theorems algebraically.	**SE/TE:** 728-734, 808-813, 814-820

★ indicates modeling standards
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Explain volume formulas and use them to solve problems. *Informal arguments for area and volume formulas can make use of the way in which area and volume scale under similarity transformations: when one figure in the plane results from another by applying a similarity transformation with scale factor k, its area is k2 times the area of the first. Similarly, volumes of solid figures scale by k3 under a similarity transformation with scale factor k.*	G.GMD.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.*	**SE/TE:** 629-634, 635-639, 645-646, 763-768, 773-779, 780-784, 785 (#1-6)
	G.GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. ★	**SE/TE:** 763-768, 773-779, 780-784, 785 (#3, 6), 788-794

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