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Common Core State Standards Alignment

Advanced Placement®

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About the College Board

The College Board is a mission-driven not-for-profit organization that connects students to college success and opportunity. Founded in 1900, the College Board was created to expand access to higher education. Today, the membership association is made up of more than 5,900 of the world's leading educational institutions and is dedicated to promoting excellence and equity in education. Each year, the College Board helps more than seven million students prepare for a successful transition to college through programs and services in college readiness and college success — including the SAT® and the Advanced Placement Program®. The organization also serves the education community through research and advocacy on behalf of students, educators and schools.

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How the Common Core State Standards Prepare Students to Engage in AP® Courses

Introduction

The College Board has been a strong advocate for and played an active role in the development of the Common Core State Standards. As part of this collaboration, the College Board helped draft the standards and helped shape the initiative by providing executive guidance on the Common Core Advisory Committee. The goal of the Common Core State Standards — to establish a common set of rigorous expectations to prepare students for college and career readiness — strongly reflects the guiding mission and values of the College Board, as well as our programs and services.

Prior to the development of these Common Core State Standards, the College Board established blue ribbon panels in English language arts, mathematics and statistics, and science to define the skills and knowledge students must develop and master to succeed in college and the workforce in the 21st century. This effort resulted in the development of the College Board Standards for College Success™. These standards for English Language Arts, Mathematics and Statistics, and Science were based on empirical research conducted by the University of Oregon's Center for Educational Policy Research in collaboration with the Association of American Universities. The standards are benchmarked against the Advanced Placement Program® (AP®) as well as national and international frameworks, including NAEP, TIMSS, and PISA (Wiley, Wyatt, & Camara, 2010). These standards were an important resource in the development of the Common Core State Standards because they were based and benchmarked on empirical evidence related to college success.

The College Board recognizes that defining clear, consistent, and rigorous standards is just the start of ensuring educational improvement. The College Board actively works with states and districts as they build their Common Core implementation plans, and we continue to provide guidance and technical assistance in the areas of:

- comprehensive alignment services;
- benchmarking standards, assessments, and performance level indicators against college outcomes;
- Common Core implementation plan development; and
- professional development.

In support of near-term goals, the College Board has developed this alignment study to document the existing correspondence between the Common Core State Standards and selected AP courses.

This report describes how the Common Core State Standards can prepare students to engage in the following courses: AP English Literature and Composition, AP English Language and Composition, AP Calculus AB, AP Calculus BC, AP Statistics, and AP Computer Science A. As new curricula and assessments emerge and existing curricula and assessments are enhanced, the College Board will conduct additional studies to understand the alignment of other forms of curricula and assessments that may be administered in support of the Common Core State Standards.

Content for Comparison

Common Core State Standards

The Common Core State Standards articulate the knowledge and skills students need to be ready to succeed in college and careers. They were designed to be (1) anchored in research and evidence; (2) aligned to college and workplace expectations; (3) rigorous, clear, and consistent; and (4) reflective of best practices in international frameworks. The standards span kindergarten through 12th grade.

The Advanced Placement Program®

AP is a rigorous academic program built on the commitment, passion, and hard work of students and educators from both secondary schools and higher education. With more than 30 courses in a wide variety of subject areas, AP provides willing and academically prepared high school students with the opportunity to study and learn at the college level.

Each AP course is modeled upon a comparable college course, and college and university faculty play a vital role in ensuring that AP courses align with college-level standards. For example, through the AP Course Audit, AP teachers submit their syllabi for review and approval by college faculty. Only courses using syllabi that meet or exceed the college-level curricular and resource requirements for each AP course are authorized to carry the "AP" label.

AP courses culminate in a suite of college-level assessments developed and scored by college and university faculty members as well as experienced AP teachers. AP Exams are an essential part of the AP experience, enabling students to demonstrate their mastery of college-level course work. Strong performance on AP Exams is rewarded by colleges and universities worldwide. More than 90 percent of four-year colleges and universities in the United States grant students credit, placement, or both on the basis of successful AP Exam scores.

AP provides willing and academically prepared high school students with the opportunity to study and learn at the college level.

Although the Common Core State Standards create a strong foundation for many AP courses, College Board content teams focused this study within the English language arts and mathematics disciplines. The following AP courses were considered within the scope of this study:

AP English Literature and Composition

An AP English Literature and Composition course engages students in the careful reading and critical analysis of imaginative literature. As they read, students consider a work's structure, style, and themes, as well as specific elements such as the use of figurative language, imagery, symbolism, and tone. Such reading should be accompanied by thoughtful discussion and writing about those books in the company of one's fellow students.

AP English Language and Composition

An AP course in English Language and Composition engages students in becoming

skilled readers of prose written in a variety of rhetorical contexts, and in becoming skilled writers who compose for a variety of purposes. Both their writing and their reading should make students aware of the interactions among a writer's purposes, audience expectations, and subjects, as well as the way genre conventions and the resources of language contribute to effectiveness in writing.

AP Calculus AB and AP Calculus BC

AP Calculus AB and AP Calculus BC are primarily concerned with developing the students' understanding of the concepts of calculus and providing experience with its methods and applications. The courses emphasize a multi-representational approach to calculus, with concepts, results, and problems expressed graphically, numerically, analytically, and verbally. Calculus BC is a full-year course in the calculus of functions of a single variable. It includes all topics taught in Calculus AB plus additional topics, but both courses are intended to be challenging and demanding; they require a similar depth of understanding of common topics.

AP Statistics

An AP course in Statistics introduces students to the major tools and concepts for collecting, representing, analyzing, and drawing conclusions from data. Students are exposed to four broad conceptual themes: exploring data, sampling and experimentation, anticipating patterns, and statistical inference.

AP Computer Science A

An AP course in Computer Science A emphasizes object-oriented programming methodology with a concentration on problem solving and algorithm development. It includes the study of data structures, design, and abstraction. A large part of the course is built around the development of computer programs that correctly solve a given problem, while developing the use of logic and formal methods of programming.

Methodology

Researchers and organizations have developed different methodologies and approaches to align standards (Brown & Conley, 2007; Rothman, 2003; Webb, 1997, 1999; Porter, 2002; Achieve, 2007, 2010; College Board, 2008, 2010; Blank, 2007), and the alignment approaches vary in terms of rigor and accuracy. The College Board employs rigorous alignment methodologies as it compares standards, curricula, and assessment frameworks and consistently adheres to the following alignment principles, which are recognized as best practices by thought leaders in the field:

- Deep and careful consideration must be given to the full intent and scope of each standards statement, with attention to both the content and skill components of the standard.
- Alignments must be made to the most specific component or grain size of the standard.
- The course materials utilized in the alignment study must clearly and explicitly outline the course objectives and expected student performances.
- Consideration and attention must be given to both content and cognitive demand (rigor) when developing alignments between standards and course materials.

These alignment principles are apparent in the alignment methodologies developed by

Norman Webb and Andrew Porter, as well as in the nationally recognized work from organizations such as Achieve, WestEd, the Education Policy Improvement Center (EPIC), the Center for Assessment, and the Surveys of Enacted Curriculum (SEC) Project led by the Council of Chief State School Officers in partnership with the University of Wisconsin.

For this study, the College Board applied these alignment principles to compare the Common Core State Standards to selected AP courses. The comparison is nuanced in that the Common Core State Standards are designed to articulate the knowledge and skills students need to be ready to succeed in college and careers, and AP courses and exams are designed to represent the level of a first-year college course. In light of this distinction, alignments between the Common Core State Standards and AP courses should not be interpreted as linkages of content or skills at the same level of rigor or challenge, but as areas where there is an identifiable bridge from one framework to another — a link from the Common Core State Standards to a specific AP course. Similarly, "gaps" should not be interpreted as Common Core State Standards that do not prepare students for AP, but as valuable, general content that contributes to a student's preparedness as a whole.

The comparison is nuanced in that the Common Core State Standards are designed to articulate the knowledge and skills students need to be ready to succeed in college and careers, and AP courses and exams are designed to represent the level of a first-year college course.

The purpose of this alignment study is to identify the Common Core State Standards that prepare students to engage in selected AP courses. Correlations between the Common Core State Standards and the AP courses are indicated in the alignment tables (appendixes A and B) by an "X" next to the Common Core State Standard under the appropriate course column.

In order for a Common Core State Standard to be considered aligned to an AP course, evidence of the extension of that Common Core State Standard must be cited from at least one document from the collection of AP course materials. Evidence of the extension of a Common Core State Standard for English Language Arts will appear in the AP English courses as content and skills similar to those of the Common Core State Standards but in the differing context of first-year college-level coursework. The relationship between a Common Core State Standard for Mathematics and the evidence of the extension in the AP Calculus courses, AP Statistics, and AP Computer Science A will appear as more of a traditional prerequisite relationship between the Common Core State Standards and the AP courses.

For further explanation of the relationship between an aligned Common Core State Standard and an AP course, see the Demonstration of Alignment Methodology table.

AP Course Materials

The following AP course materials informed this study:

- AP Course Descriptions–Detailed descriptions of the AP courses and exams.
- AP Curricular Requirements–The set of curricular and resource expectations that college faculty nationwide have established for college-level courses.
- AP Teacher's Guides–Additional information on the AP course, exam, curricular requirements, available resources, and sample lessons and syllabi.
- AP Syllabus Development Guides–Subject-specific documents that contain multiple samples of evidence for each requirement, illustrating the variety of ways curricular requirements can be met in a syllabus.
- AP Released Exams–Documents that include an AP Exam that was once administered as a live exam and supporting information such as answer keys and statistical information about student performance when the exam was administered.
- AP Exam Specifications–Statistical and content-based blueprints for the design of AP Exams.

This collection of resources presents a detailed view of the content knowledge and skills students should master upon completion of an AP course.

The College Board aligned the AP English courses, the AP Calculus courses, AP Statistics, and AP Computer Science A to the following Common Core State Standards grade levels and strands:

AP English Literature and AP English Language:

Both AP English Literature and AP English Language were aligned to the Common Core State Standards for English Language Arts grade bands 9–10 and 11–12, as well as to the College and Career Readiness Anchor Standards[1] (Anchor Standards).

All strands of the Common Core State Standards for English Language Arts were considered for this alignment study (i.e., all Anchor Standards, Reading Standards for Literature, Reading Standards for Informational Text, Writing Standards, Speaking and Listening Standards, and Language Standards/Progressive Skills)[2].

AP Calculus, AP Statistics, and AP Computer Science A:

AP Calculus AB, AP Calculus BC, AP Statistics, and AP Computer Science A were aligned to the Common Core State Standards for Mathematics grade 6 through high school, as well as to the Standards for Mathematical Practice. Middle school mathematics standards were included in this alignment study because content within the Common Core State Standards at the middle school grade levels had been traditionally identified within high school-level coursework in most state standards. In addition, in order to accurately demonstrate the body of prerequisite knowledge and skills required to be prepared for an AP mathematics courses, it was necessary to include the full middle school and high school Common Core State Standards.

1. The College and Career Readiness Anchor Standards define general literacy expectations and are meant to be considered in tandem with the Common Core State Standards high school grade bands.

2. The Standards for Literacy in History/Social Studies, Science, and Technical Subjects were not included within the scope of this alignment study. These literacy standards are designed to inform literacy instruction across the disciplines and so would not be appropriate for an alignment to the AP English courses.

It is important to note that the intent of the Common Core State Standards is to provide focused standards that all students should meet in order to be college and career ready. Additional mathematics content that students should learn in order to take advanced courses such as calculus, advanced statistics, or discrete mathematics is indicated by a (+) within the Common Core State Standards for Mathematics and the alignment table.

Summary of the Alignment Between the Common Core State Standards and AP English and Mathematics Courses

Given the nature of the alignment between the Common Core State Standards and AP courses, it is more appropriate to discuss the degrees of alignment in terms of concentration instead of strength of coverage. As expected, the highest concentration of alignment between the Common Core State Standards and AP courses occurs within the strand most specific to the AP course (e.g., the highest concentration of alignment between the Common Core State Standards and AP English Language occurs within the Reading Standards for Informational Text). Overall, the alignment indicates that a student following a curriculum based on the Common Core State Standards would be well prepared for a number of AP courses.

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AP English Literature and Composition

There is a high concentration of alignment between the Common Core State Standards for English Language Arts and AP English Literature, specifically in the areas of the Reading Anchor Standards, the Reading Standards for Literature at grade bands 9–10 and 11–12, the Writing Anchor Standards, the Writing Standards at grade bands 9–10 and 11–12, the Language Anchor Standards, and the Language Standards and Progressive Skills at grade bands 9–10 and 11–12. The few Common Core State Standards in these strands that do not align to AP English Literature should not be considered superfluous. Some standards, such as those that reference comparing artistic media, will enhance a student's preparation for AP but are not directly evidenced in the AP materials.

The scarcity of alignment between the Reading Standards for Informational Text and AP English Literature is to be expected. While informational text may be useful for students conducting a critical analysis of fiction, the focus of AP English Literature is decidedly imaginative literature. Similarly, there is less frequent alignment between AP English Literature and the groups of Common Core State Standards in Writing and Language that address the more specific elements of research and the use of reference materials. There is also a lower concentration of alignment between the Speaking and Listening Standards and AP English Literature. This limited alignment should not be interpreted to mean that these standards do not contribute to a student's preparation for AP. Speaking and listening

skills, such as those addressed in the Common Core State Standards, are expected to be mastered by students prior to their entering an AP course and so are not emphasized in the AP English Course Description. In addition, these skills, typically evaluated through classroom observation, are unlikely to appear in materials related to assessment.

AP English Language and Composition

The most concentrated alignment between the Common Core State Standards for English Language Arts and AP English Language occurs in the areas of the Reading Anchor Standards and the Reading Standards for Informational Text at grade bands 9–10 and 11–12. In addition, there is a high concentration of alignment in the areas of the Writing Anchor Standards, the Writing Standards at grade bands 9–10 and 11–12, the Language Anchor Standards, and the Language Standards and Progressive Skills at grade bands 9–10 and 11–12. Because the AP English Course Description notes that fiction and poetry can have a place in the AP English Language course, there is also significant alignment between the Reading Standards for Literature and AP English Language.

There is limited alignment between the Speaking and Listening Standards and AP English Language. Much like the relationship between the Speaking and Listening Standards and AP English Literature, speaking and listening skills are valuable to a student entering AP English Language; however, these skills are considered prerequisite and best measured through classroom observation. For these reasons, speaking and listening skills are not emphasized as part of the AP English Course Description or exam materials, but they are evident within AP classroom practice.

AP Calculus AB and AP Calculus BC

The Common Core State Standards for Mathematics contain additional standards, identified by a (+), to indicate concepts linked to more advanced work in mathematics, work that may lead to a course such as AP Calculus. A majority of these "+" standards were linked to AP Calculus AB and AP Calculus BC as prerequisite skills, which illustrates how AP Calculus is part of a logical progression in an advanced mathematics course plan.

There is a high concentration of alignment between the Common Core State Standards for Mathematics at the grade 6 through high school level within the Standards for Mathematical Practice as well as in the conceptual categories of Number and Quantity, Algebra, Functions, and Geometry. As anticipated, a less concentrated alignment to the Common Core State Standards at the grade 6 through high school level occurs in the conceptual category of Statistics and Probability. Standards that align to AP Calculus BC but not to AP Calculus AB are those standards that provide support for the study of content unique to AP Calculus BC such as polar and vector functions.

AP Statistics

AP Statistics should also be viewed as part of a logical progression in an advanced mathematics course plan based upon the Common Core State Standards. There is a high concentration of alignment between the Common Core State Standards for Mathematics at the grade 6 through high school level and AP Statistics within the Standards for Mathematical Practice as well as in the conceptual categories of Statistics and Probability, Number and Quantity, Algebra, and Functions. While the alignment to the Common Core State Standards at the grade 6 through high school level is less concentrated in the conceptual category of Geometry, it is important to understand that the AP Statistics course is considered an option for any secondary school student who has successfully completed a second course in algebra. Teachers and curriculum developers should not interpret a less concentrated alignment in conceptual categories to mean that there is no benefit to mastering those

uncorrelated standards prior to taking an AP Statistics course. Those skills will enhance the student's mathematical abilities and afford the student a more rounded opportunity for success in AP Statistics.

AP Computer Science A

AP Computer Science A aligns to the Common Core State Standards for Mathematics in a less concentrated manner. As stated within the AP Computer Science A documents, the prerequisite skills needed to be successful in an AP Computer Science A course include knowledge of basic algebra and functions as well as problem-solving skills. Concentration of alignment to the Common Core State Standards for Mathematics at the grade 6 through high school level occurs primarily within the Standards for Mathematical Practice and within the conceptual categories of Algebra and Number and Quantity. A less concentrated alignment to the Common Core State Standards is evident within the conceptual categories of Functions and Geometry.

Despite the lower concentration of alignment in some conceptual categories, it can be concluded that the Common Core State Standards for Mathematics effectively prepare students to participate in AP Computer Science A. Students learning the mathematics of the Common Core State Standards will have experienced mathematical content and skills that go beyond the minimum requirements of the mathematics skills needed to be prepared to take the AP Computer Science A course. Teachers and curriculum developers should not interpret a lack of correlation to mean that there is no benefit to mastering the uncorrelated standards prior to taking an AP Computer Science A course. Those skills will enhance the student's mathematical abilities and afford the student a more rounded opportunity for success in AP Computer Science A.

Demonstration of Alignment Methodology Table

This table illustrates the methodology used in the alignment study by highlighting examples of the relationship between the Common Core State Standards and AP courses. In order for a Common Core State Standard to be considered aligned to an AP course, evidence of the extension of that Common Core State Standard must be cited from least one of the documents from the collection of AP course materials. The full alignment tables (appendixes A and B) demonstrate a macroscopic view of this methodology.

AP Course	Common Core State Standard	Evidence of Extension into AP
AP English Literature	Demonstrate knowledge of eighteenth-, nineteenth- and early twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics. (RL.11-12.9)	By the time the student completes AP English Literature and Composition, she or he will have studied during high school literature from both British and American writers, as well as works written in several genres from the sixteenth century to contemporary times. The works selected for the course should require careful, deliberate reading that yields multiple meanings. (AP English Literature and Composition: Curricular Requirements)
	Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence. (W.CCR.1)	Writing is an integral part of the AP English Literature and Composition course and exam. Writing assignments focus on the critical analysis of literature and include expository, analytical and argumentative essays. (AP English Course Description)

AP Course	Common Core State Standard	Evidence of Extension into AP
AP English Language	Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism. (W.CCR.8)	The course teaches research skills, and in particular, the ability to evaluate, use and cite primary and secondary sources. The course assigns projects such as the researched argument paper, which goes beyond the parameters of a traditional research paper by asking students to present an argument of their own that includes the analysis and synthesis of ideas from an array of sources. (AP English Language and Composition: Curricular Requirements)
	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. (L.CCR.1)	The intense concentration on language use in the course enhances students' ability to use grammatical conventions appropriately and to develop stylistic maturity in their prose. (AP English Course Description)
AP Calculus AB	*Understand the relationship between zeros and factors of polynomials.* Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. (A-APR.3)	Students enrolled in an AP Calculus AB course will study limits of functions and will develop an intuitive understanding of the limiting process, the ability to calculate limits using algebra, and estimate limits from graphs or tables of data. (AP Calculus Course Description)
AP Calculus BC	*Represent and model with vector quantities.* Solve problems involving velocity and other quantities that can be represented by vectors. (N-VM.3)	Students enrolled in an AP Calculus BC course will study the applications of derivatives. Students will analyze planar curves given in parametric form, polar form and vector form, including velocity and acceleration. (AP Calculus Course Description)
AP Calculus AB & AP Calculus BC	*Use appropriate tools strategically.* Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include … a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students … make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. … They are able to use technological tools to explore and deepen their understanding of concepts. (MP.5)	Students enrolled in an AP Calculus course will study the analysis of graphs. With the aid of technology, graphs of functions are often easy to produce. The emphasis is on the interplay between the geometric and analytic information and on the use of calculus both to predict and to explain the observed local and global behavior of a function. (AP Calculus Course Description)
AP Statistics	*Make inferences and justify conclusions from sample surveys, experiments, and observational studies.* Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. (S-IC.4)	Students enrolled in an AP statistics course will study four major themes, one of which is exploring data. Exploratory analysis of data makes use of graphical and numerical techniques to study patterns and departures from patterns. Emphasis is placed on interpreting information from graphical and numerical displays and summaries. This includes constructing and interpreting graphical displays of distributions of univariate data (dot plot, stem plot, histogram, cumulative frequency plot). Students will study center and spread, clusters and gaps, outliers and other unusual features, and shape. (AP Statistics Course Description)

AP Course	Common Core State Standard	Evidence of Extension into AP
AP Statistics	*Construct viable arguments and critique the reasoning of others.* Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. … They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and — if there is a flaw in an argument — explain what it is. … Students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments. (MP.3)	Students enrolled in an AP statistics course will study four major themes, one of which is statistical inference. Statistical inference guides the selection of appropriate models. Models and data interact in statistical work: models are used to draw conclusions from data, while the data are allowed to criticize and even falsify the model through inferential and diagnostic methods. Inference from data can be thought of as the process of selecting a reasonable model, including a statement in probability language of how confident one can be about the selection. (AP Statistics Course Description)
AP Computer Science A	*Understand the concept of a function and use function notation.* Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$. (F-IF.1)	A student in the AP Computer Science A course should be comfortable with functions and the concepts found in the uses of functional notation, such as $f(x) = x + 2$ and $f(x) = g(h(x))$. (AP Computer Science A Course Description)
	Reason abstractly and quantitatively. Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize — to abstract a given situation and represent it symbolically … — and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects. (MP.2)	By the time students complete the AP Computer Science course, they should be able to design and implement solutions to problems by writing, running and debugging computer programs. To do this, they should be able to develop and select appropriate algorithms and data structures to solve problems. (AP Computer Science A Course Description)

References

Achieve. (2007). *Aligned expectations? A closer look at college admissions and placement tests*. Washington, DC: Author.

Achieve. (2010). *A comparison of the Common Core State Standards for mathematics to the American Diploma Project Benchmarks for mathematics.* Washington, DC: Author.

Blank, R. K. (2007). *Alignment content analysis of NAEP 2007 Mathematics assessment using the Surveys of Enacted Curriculum methodology.* National Center for Education Statistics.

Brown, R. S., & Conley, D. T. (2007). Comparing state high school assessments to standards for success in entry-level university courses. *Educational Assessment*, 12(2), 137–160.

Carter, D. C. (2007). *AP Computer Science Teacher's Guide*. Retrieved from the College Board website: http://apcentral.collegeboard.com/apc/members/repository/ap07_compsci_teachersguide.pdf

College Board. (2007). *Syllabus Development Guide: AP English Language and Composition.* Retrieved from College Board website: http://apcentral.collegeboard.com/apc/public/repository/SDG-EnglishLanguage.pdf

College Board. (2007). *Syllabus Development Guide: AP English Literature and Composition*. Retrieved from College Board website: http://apcentral.collegeboard.com/apc/public/ repository/SDGEnglishLiterature.pdf

College Board. (2008). *AP® English Literature and Composition 2008 Free-Response Questions*. Retrieved from College Board website: http://apcentral.collegeboard.com/apc/public/repository/ap08_eng_lit_frq.pdf

College Board. (2008). *2007 AP Statistics Released Exam*. New York: The College Board.

College Board. (2008). *Report on the rigor and alignment to college readiness of the Colorado Model Content Standards for Reading and Writing and Mathematics*. New York: The College Board.

College Board. (2010). *2009 AP Computer Science A Released Exam*. New York: The College Board.

College Board. (2010). *AP Computer Science A Course Description*. Retrieved from College Board website: http://apcentral.collegeboard.com/apc/public/repository/ap-calculus-course-description.pdf

College Board. (2010). *AP Calculus Course Description*. Retrieved from College Board website: http://apcentral.collegeboard.com/apc/public/repository/ap-calculus-course-description.pdf

College Board. (2010). *AP English Course Description*. Retrieved from College Board website: http://apcentral.collegeboard.com/apc/public/repository/ap-english-course-description.pdf

College Board. (2010). *AP English Language and Composition: Curricular Requirements.* Retrieved from College Board website: http://www.collegeboard.com/html/apcourseaudit/courses/english_curricular_requirements.html

College Board. (2010). *AP English Literature and Composition: Curricular Requirements*. Retrieved from College Board website: http://www.collegeboard.com/html/apcourseaudit/courses/english_lit_curricular_requirements.html

College Board. (2010). *AP Statistics Course Description*. Retrieved from College Board website: http://apcentral.collegeboard.com/apc/public/repository/ap-statistics-course-description.pdf

College Board. (2010). *How the College Board Standards for College Success align to the Common Core State Standards*. New York: The College Board.

College Board. (2011). *Assembly specifications grid for Advanced Placement Calculus AB/ Calculus BC multiple choice sections*. Unpublished test specifications.

Howell, M. (2007). *AP Calculus Teacher's Guide*. Retrieved from College Board website: http://apcentral.collegeboard.com/apc/members/repository/ap07_calculus_teachersguide_2.pdf

Legacy, M. (2008). *AP Statistics Teacher's Guide*. Retrieved from College Board website: http://apcentral.collegeboard.com/apc/public/repository/AP_Statistics_Teacher_Guide.pdf

Porter, A. C. (2002). Measuring the content of instruction: Uses in research and practice. *Educational Researcher, 31*(7), 3–14.

Rothman, R. (2003, March). *Imperfect matches: The alignment of standards and tests*. Paper commissioned by the Committee on Test Design for K–12 Science Achievement.

Vasavada, N., Carman, E., Hart, B., & Luisier, D. (2010). *Common Core State Standards alignment: ReadiStep™, PSAT/NMSQT® and SAT®*. (College Board Research Report 2010-5). Retrieved from College Board website: http://professionals.collegeboard.com/data-reports-research/cb/common_core_alignments

Webb, N. L. (1997). *Criteria for alignment of expectations and assessments in mathematics and science education*. (Research Monograph No. 6). Washington, DC: Council of Chief State School Officers.

Webb, N. L. (1999). *Alignment of science and mathematics standards and assessments in four states*. (Research Monograph No. 18). Madison, WI: University of Wisconsin-Wisconsin Center for Education Research.

Wiley, A., Wyatt, J., & Camara, W. J. (2010). *The development of a multidimensional college readiness index*. (College Board Research Report 2010-3). Retrieved from College Board website: http://professionals.collegeboard.com/profdownload/pdf/10b_3110_CollegeReadiness_RR_WEB_110315.pdf

Appendix A

AP English — Common Core State Standards Side-by-Side Alignment Table

AP English — Common Core State Standards Side-by-Side Alignment Table

Common Core State Standards						AP Course	
Grade	**Strand**	**Band**	**Standard**	**Skill**	**CCSS ID**	**AP Literature**	**AP Language**
CCR	Reading	Key Ideas and Details	Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.		R.CCR.1	X	X
			Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.		R.CCR.2	X	X
			Analyze how and why individuals, events, and ideas develop and interact over the course of a text.		R.CCR.3	X	X
		Craft and Structure	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.		R.CCR.4	X	X
			Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.		R.CCR.5	X	X
			Assess how point of view or purpose shapes the content and style of a text.		R.CCR.6	X	X
		Integration of Knowledge and Ideas	Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.*		R.CCR.7		X
			Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.		R.CCR.8	X	X
			Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.		R.CCR.9	X	X
		Range of Reading and Level of Text Complexity	Read and comprehend complex literary and informational texts independently and proficiently.		R.CCR.10	X	X

Common Core State Standards						AP Course	
Grade	**Strand**	**Band**	**Standard**	**Skill**	**CCSS ID**	**AP Literature**	**AP Language**
9-10	Reading Standards for Literature	Key Ideas and Details	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.		RL.9-10.1	X	X
			Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.		RL.9-10.2	X	
			Analyze how complex characters (e.g., those with multiple or conflicting motivations) develop over the course of a text, interact with other characters, and advance the plot or develop the theme.		RL.9-10.3	X	
		Craft and Structure	Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language evokes a sense of time and place; how it sets a formal or informal tone).		RL.9-10.4	X	X
			Analyze how an author's choices concerning how to structure a text, order events within it (e.g., parallel plots), and manipulate time (e.g., pacing, flashbacks) create such effects as mystery, tension, or surprise.		RL.9-10.5	X	X
			Analyze a particular point of view or cultural experience reflected in a work of literature from outside the United States, drawing on a wide reading of world literature.		RL.9-10.6	X	
		Integration of Knowledge and Ideas	Analyze the representation of a subject or a key scene in two different artistic mediums, including what is emphasized or absent in each treatment (e.g., Auden's "Musée des Beaux Arts" and Breughel's *Landscape with the Fall of Icarus*).		RL.9-10.7		
			(Not applicable to literature)		RL.9-10.8		
			Analyze how an author draws on and transforms source material in a specific work (e.g., how Shakespeare treats a theme or topic from Ovid or the Bible or how a later author draws on a play by Shakespeare).		RL.9-10.9	X	

Common Core State Standards						AP Course	
Grade	Strand	Band	Standard	Skill	CCSS ID	AP Literature	AP Language
		Range of Reading and Level of Text Complexity	By the end of grade 9, read and comprehend literature, including stories, dramas, and poems, in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 10, read and comprehend literature, including stories, dramas, and poems, at the high end of the grades 9–10 text complexity band independently and proficiently.		RL.9-10.10	X	X
11-12	Reading Standards for Literature	Key Ideas and Details	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.		RL.11-12.1	X	X
			Determine two or more themes or central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to produce a complex account; provide an objective summary of the text.		RL.11-12.2	X	
			Analyze the impact of the author's choices regarding how to develop and relate elements of a story or drama (e.g., where a story is set, how the action is ordered, how the characters are introduced and developed).		RL.11-12.3	X	
		Craft and Structure	Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including words with multiple meanings or language that is particularly fresh, engaging, or beautiful. (Include Shakespeare as well as other authors.)		RL.11-12.4	X	X
			Analyze how an author's choices concerning how to structure specific parts of a text (e.g., the choice of where to begin or end a story, the choice to provide a comedic or tragic resolution) contribute to its overall structure and meaning as well as its aesthetic impact.		RL.11-12.5	X	X

Common Core State Standards						AP Course	
Grade	**Strand**	**Band**	**Standard**	**Skill**	**CCSS ID**	**AP Literature**	**AP Language**
			Analyze a case in which grasping point of view requires distinguishing what is directly stated in a text from what is really meant (e.g., satire, sarcasm, irony, or understatement).		RL.11-12.6	X	X
		Integration of Knowledge and Ideas	Analyze multiple interpretations of a story, drama, or poem (e.g., recorded or live production of a play or recorded novel or poetry), evaluating how each version interprets the source text. (Include at least one play by Shakespeare and one play by an American dramatist.)		RL.11-12.7		
			(Not applicable to literature)		RL.11-12.8		
			Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics.		RL.11-12.9	X	
		Range of Reading and Level of Text Complexity	By the end of grade 11, read and comprehend literature, including stories, dramas, and poems, in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literature, including stories, dramas, and poems, at the high end of the grades 11–CCR text complexity band independently and proficiently.		RL.11-12.10	X	X
9-10	Reading Standards for Informational Text	Key Ideas and Details	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.		RI.9-10.1		X
			Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.		RI.9-10.2		X
			Analyze how the author unfolds an analysis or series of ideas or events, including the order in which the points are made, how they are introduced and developed, and the connections that are drawn between them.		RI.9-10.3		X

Common Core State Standards						AP Course	
Grade	Strand	Band	Standard	Skill	CCSS ID	AP Literature	AP Language
		Craft and Structure	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).		RI.9-10.4		X
			Analyze in detail how an author's ideas or claims are developed and refined by particular sentences, paragraphs, or larger portions of a text (e.g., a section or chapter).		RI.9-10.5		X
			Determine an author's point of view or purpose in a text and analyze how an author uses rhetoric to advance that point of view or purpose.		RI.9-10.6		X
		Integration of Knowledge and Ideas	Analyze various accounts of a subject told in different mediums (e.g., a person's life story in both print and multimedia), determining which details are emphasized in each account.		RI.9-10.7		X
			Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning.		RI.9-10.8		X
			Analyze seminal U.S. documents of historical and literary significance (e.g., Washington's Farewell Address, the Gettysburg Address, Roosevelt's Four Freedoms speech, King's "Letter from Birmingham Jail"), including how they address related themes and concepts.		RI.9-10.9		X
		Range of Reading and Level of Text Complexity	By the end of grade 9, read and comprehend literary nonfiction in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 10, read and comprehend literary nonfiction at the high end of the grades 9–10 text complexity band independently and proficiently.		RI.9-10.10		X
11-12	Reading Standards for Informational Text	Key Ideas and Details	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.		RI.11-12.1		X

Common Core State Standards						AP Course	
Grade	**Strand**	**Band**	**Standard**	**Skill**	**CCSS ID**	**AP Literature**	**AP Language**
			Determine two or more central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis; provide an objective summary of the text.		RI.11-12.2		X
			Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.		RI.11-12.3		X
		Craft and Structure	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g., how Madison defines *faction* in *Federalist No. 10*).		RI.11-12.4		X
			Analyze and evaluate the effectiveness of the structure an author uses in his or her exposition or argument, including whether the structure makes points clear, convincing, and engaging.		RI.11-12.5		X
			Determine an author's point of view or purpose in a text in which the rhetoric is particularly effective, analyzing how style and content contribute to the power, persuasiveness, or beauty of the text.		RI.11-12.6		X
		Integration of Knowledge and Ideas	Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.		RI.11-12.7		X
			Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning (e.g., in U.S. Supreme Court majority opinions and dissents) and the premises, purposes, and arguments in works of public advocacy (e.g., *The Federalist*, presidential addresses).		RI.11-12.8		X

Common Core State Standards						AP Course	
Grade	Strand	Band	Standard	Skill	CCSS ID	AP Literature	AP Language
			Analyze seventeenth-, eighteenth-, and nineteenth-century foundational U.S. documents of historical and literary significance (including The Declaration of Independence, the Preamble to the Constitution, the Bill of Rights, and Lincoln's Second Inaugural Address) for their themes, purposes, and rhetorical features.		RI.11-12.9		X
		Range of Reading and Level of Text Complexity	By the end of grade 11, read and comprehend literary nonfiction in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literary nonfiction at the high end of the grades 11–CCR text complexity band independently and proficiently.		RI.11-12.10		X
CCR	Writing	Text Types and Purposes*	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.		W.CCR.1	X	X
			Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.		W.CCR.2	X	X
			Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.		W.CCR.3	X	X
		Production and Distribution of Writing	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		W.CCR.4	X	X
			Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.		W.CCR.5	X	X
			Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.		W.CCR.6		

Common Core State Standards						AP Course	
Grade	**Strand**	**Band**	**Standard**	**Skill**	**CCSS ID**	**AP Literature**	**AP Language**
		Research to Build and Present Knowledge	Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.		W.CCR.7	X	X
			Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.		W.CCR.8		X
			Draw evidence from literary or informational texts to support analysis, reflection, and research.		W.CCR.9	X	X
		Range of Writing	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.		W.CCR.10	X	X
9-10	Writing	Text Types and Purposes	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.	Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence.	W.9-10.1a	X	X
				Develop claim(s) and counterclaims fairly, supplying evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level and concerns.	W.9-10.1b	X	X
				Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.	W.9-10.1c	X	X
				Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.	W.9-10.1d	X	X
				Provide a concluding statement or section that follows from and supports the argument presented.	W.9-10.1e		X

Common Core State Standards						AP Course	
Grade	Strand	Band	Standard	Skill	CCSS ID	AP Literature	AP Language
			Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.	Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.	W.9-10.2a	X	X
				Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.	W.9-10.2b	X	X
				Use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.	W.9-10.2c	X	X
				Use precise language and domain-specific vocabulary to manage the complexity of the topic.	W.9-10.2d	X	X
				Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.	W.9-10.2e	X	X
				Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	W.9-10.2f		X
			Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.	Engage and orient the reader by setting out a problem, situation, or observation, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events.	W.9-10.3a	X	X
				Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters.	W.9-10.3b	X	X
				Use a variety of techniques to sequence events so that they build on one another to create a coherent whole.	W.9-10.3c	X	X

Common Core State Standards						AP Course	
Grade	**Strand**	**Band**	**Standard**	**Skill**	**CCSS ID**	**AP Literature**	**AP Language**
				Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters.	W.9-10.3d	X	X
				Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.	W.9-10.3e		
		Production and Distribution of Writing	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)		W.9-10.4	X	X
			Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grades 9–10 on page 54.)		W.9-10.5	X	X
			Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.		W.9-10.6		
		Research to Build and Present Knowledge	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.		W.9-10.7	X	X
			Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.		W.9-10.8		X

Common Core State Standards						AP Course	
Grade	**Strand**	**Band**	**Standard**	**Skill**	**CCSS ID**	**AP Literature**	**AP Language**
			Draw evidence from literary or informational texts to support analysis, reflection, and research.	Apply *grades 9–10 Reading standards* to literature (e.g., "Analyze how an author draws on and transforms source material in a specific work [e.g., how Shakespeare treats a theme or topic from Ovid or the Bible or how a later author draws on a play by Shakespeare]").	W.9-10.9a	X	X
				Apply *grades 9–10 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning").	W.9-10.9b		X
		Range of Writing	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.		W.9-10.10	X	X
11-12	Writing	Text Types and Purposes	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.	Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence.	W.11-12.1a	X	X
				"Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level, concerns, values, and possible biases.	W.11-12.1b	X	X
				Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.	W.11-12.1c	X	X
				Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.	W.11-12.1d	X	X

Common Core State Standards						AP Course	
Grade	Strand	Band	Standard	Skill	CCSS ID	AP Literature	AP Language
				Provide a concluding statement or section that follows from and supports the argument presented.	W.11-12.1e		
			Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.	Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.	W.11-12.2a	X	X
				Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.	W.11-12.2b	X	X
				Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.	W.11-12.2c	X	X
				Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.	W.11-12.2d	X	X
				Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.	W.11-12.2e	X	X
				Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	W.11-12.2f		
			Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.	Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events.	W.11-12.3a	X	X

Common Core State Standards						AP Course	
Grade	Strand	Band	Standard	Skill	CCSS ID	AP Literature	AP Language
				Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters.	W.11-12.3b	X	X
				Use a variety of techniques to sequence events so that they build on one another to create a coherent whole and build toward a particular tone and outcome (e.g., a sense of mystery, suspense, growth, or resolution).	W.11-12.3c	X	X
				Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters.	W.11-12.3d	X	X
				Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.	W.11-12.3e		
		Production and Distribution of Writing	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)		W.11-12.4	X	X
			Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grades 11–12 on page 54.)		W.11-12.5	X	X
			Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.		W.11-12.6		

Common Core State Standards						AP Course	
Grade	**Strand**	**Band**	**Standard**	**Skill**	**CCSS ID**	**AP Literature**	**AP Language**
		Research to Build and Present Knowledge	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.		W.11-12.7	X	X
			Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.		W.11-12.8		X
			Draw evidence from literary or informational texts to support analysis, reflection, and research.	Apply *grades 11–12 Reading standards* to literature (e.g., "Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics").	W.11-12.9a	X	X
				Apply *grades 11–12 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning [e.g., in U.S. Supreme Court Case majority opinions and dissents] and the premises, purposes, and arguments in works of public advocacy [e.g., *The Federalist*, presidential addresses]").	W.11-12.9b		X
		Range of Writing	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.		W.11-12.10	X	X
CCR	Speaking and Listening	Comprehension and Collaboration	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.		SL.CCR.1	X	

Common Core State Standards						AP Course	
Grade	**Strand**	**Band**	**Standard**	**Skill**	**CCSS ID**	**AP Literature**	**AP Language**
			Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.		SL.CCR.2		
			Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.		SL.CCR.3		
		Presentation of Knowledge and Ideas	Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.		SL.CCR.4		
			Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.		SL.CCR.5		
			Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.		SL.CCR.6		
9-10	Speaking and Listening Standards	Comprehension and Collaboration	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grades 9–10 topics, texts, and issues,* building on others' ideas and expressing their own clearly and persuasively.	Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.	SL.9-10.1a	X	
				Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed.	SL.9-10.1b		
				Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.	SL.9-10.1c		
				Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.	SL.9-10.1d		

Common Core State Standards						AP Course	
Grade	**Strand**	**Band**	**Standard**	**Skill**	**CCSS ID**	**AP Literature**	**AP Language**
			Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.		SL.9-10.2		
			Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.		SL.9-10.3		
		Presentation of Knowledge and Ideas	Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.		SL.9-10.4		
			Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.		SL.9-10.5		
			Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9–10 Language standards 1 and 3 on pages 54 for specific expectations.)		SL.9-10.6		
11-12	Speaking and Listening Standards	Comprehension and Collaboration	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grades 11–12 topics, texts, and issues,* building on others' ideas and expressing their own clearly and persuasively.	Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.	SL.11-12.1a	X	
				Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.	SL.11-12.1b		
				Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.	SL.11-12.1c		

Common Core State Standards						AP Course	
Grade	Strand	Band	Standard	Skill	CCSS ID	AP Literature	AP Language
				Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.	SL.11-12.1d		
			Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.		SL.11-12.2		
			Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.		SL.11-12.3		
		Presentation of Knowledge and Ideas	Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.		SL.11-12.4		
			Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.		SL.11-12.5		
			Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate. (See grades 11–12 Language standards 1 and 3 on page 54 for specific expectations.)		SL.11-12.6		
CCR	Language	Conventions of Standard English	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.		L.CCR.1	X	X
			Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.		L.CCR.2	X	X

Common Core State Standards						AP Course	
Grade	**Strand**	**Band**	**Standard**	**Skill**	**CCSS ID**	**AP Literature**	**AP Language**
		Knowledge of Language	Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.		L.CCR.3	X	X
		Vocabulary Acquisition and Use	Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.		L.CCR.4	X	X
			Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.		L.CCR.5	X	X
			Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.		L.CCR.6	X	X
9-10	Language	Conventions of Standard English	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	Use parallel structure.*	L.9-10.1a	X	X
				Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.	L.9-10.1b	X	X
				Ensure subject-verb and pronoun-antecedent agreement.	L.3.1f	X	X
				Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons.	L.4.1f	X	X
				Correctly use frequently confused words (e.g., *to/too/two; there/their*).	L.4.1g	X	X
				Recognize and correct inappropriate shifts in verb tense.	L.5.1d	X	X

Common Core State Standards						AP Course	
Grade	Strand	Band	Standard	Skill	CCSS ID	AP Literature	AP Language
				Recognize and correct inappropriate shifts in pronoun number and person.	L.6.1c	X	X
				Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).	L.6.1d	X	X
				"Recognize variations from standard English in their own and others' writing and speaking, and identify and use strategies to improve expression in conventional language.	L.6.1e	X	X
				Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers.	L.7.1c	X	X
				Recognize and correct inappropriate shifts in verb voice and mood.	L.8.1d	X	X
			Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.	Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.	L.9-10.2a	X	X
				Use a colon to introduce a list or quotation.	L.9-10.2b	X	X
				Spell correctly.	L.9-10.2c	X	X
				Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements.	L.6.2a	X	X
		Knowledge of Language	Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.	Write and edit work so that it conforms to the guidelines in a style manual (e.g., *MLA Handbook*, Turabian's *Manual for Writers*) appropriate for the discipline and writing type.	L.9-10.3a		X
				Choose words and phrases for effect.	L.3.3a	X	X
				Choose punctuation for effect.	L.4.3b	X	X
				Vary sentence patterns for meaning, reader/listener interest, and style.‡	L.6.3a	X	X
				Maintain consistency in style and tone.	L.6.3b	X	X
				Choose language that expresses ideas precisely and concisely, recognizing and eliminating wordiness and redundancy.	L.7.3a	X	X
		Vocabulary Acquisition and Use	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 9–10 reading and content, choosing flexibly from a range of strategies.	Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.	L.9-10.4a	X	X

Common Core State Standards						AP Course	
Grade	**Strand**	**Band**	**Standard**	**Skill**	**CCSS ID**	**AP Literature**	**AP Language**
				Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., *analyze*, *analysis*, *analytical*; *advocate*, *advocacy*).	L.9-10.4b		
				Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology.	L.9-10.4c		
				Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).	L.9-10.4d	X	X
			Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.	Interpret figures of speech (e.g., euphemism, oxymoron) in context and analyze their role in the text.	L.9-10.5a	X	X
				Analyze nuances in the meaning of words with similar denotations.	L.9-10.5b	X	X
			Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.		L.9-10.6	X	X
11-12	Language	Conventions of Standard English	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	Apply the understanding that usage is a matter of convention, can change over time, and is sometimes contested.	L.11-12.1a	X	
				Resolve issues of complex or contested usage, consulting references (e.g., *Merriam-Webster's Dictionary of English Usage, Garner's Modern American Usage*) as needed.	L.11-12.1b		
				Ensure subject-verb and pronoun-antecedent agreement.	L.3.1f	X	X
				Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons.	L.4.1f	X	X

Common Core State Standards						AP Course	
Grade	Strand	Band	Standard	Skill	CCSS ID	AP Literature	AP Language
				Correctly use frequently confused words (e.g., *to/too/two; there/their*).	L.4.1g	X	X
				Recognize and correct inappropriate shifts in verb tense.	L.5.1d	X	X
				Recognize and correct inappropriate shifts in pronoun number and person.	L.6.1c	X	X
				Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).	L.6.1d	X	X
				Recognize variations from standard English in their own and others' writing and speaking, and identify and use strategies to improve expression in conventional language.	L.6.1e	X	X
				Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers.	L.7.1c	X	X
				Recognize and correct inappropriate shifts in verb voice and mood.	L.8.1d	X	X
				Use parallel structure.	L.9-10.1a	X	X
			Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.	Observe hyphenation conventions.	L.11-12.2a	X	X
				Spell correctly.	L.11-12.2b	X	X
				Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements.	L.6.2a	X	X
		Knowledge of Language	Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.	Vary syntax for effect, consulting references (e.g., Tufte's *Artful Sentences*) for guidance as needed; apply an understanding of syntax to the study of complex texts when reading.	L.11-12.3a	X	X
				Choose words and phrases for effect.	L.3.3a	X	X
				Choose punctuation for effect.	L.4.3b	X	X
				Maintain consistency in style and tone.	L.6.3b	X	X
				Choose language that expresses ideas precisely and concisely, recognizing and eliminating wordiness and redundancy.	L.7.3a	X	X

English Language Arts Side-by-Side Alignment Table: AP®—Common Core State Standards

Common Core State Standards						AP Course	
Grade	**Strand**	**Band**	**Standard**	**Skill**	**CCSS ID**	**AP Literature**	**AP Language**
		Vocabulary Acquisition and Use	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grades 11–12 reading and content*, choosing flexibly from a range of strategies.	Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.	L.11-12.4a	X	X
				Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., *conceive, conception, conceivable*).	L.11-12.4b		
				Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, its etymology, or its standard usage.	L.11-12.4c		
				Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).	L.11-12.4d	X	X
			Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.	Interpret figures of speech (e.g., hyperbole, paradox) in context and analyze their role in the text.	L.11-12.5a	X	X
				Analyze nuances in the meaning of words with similar denotations.	L.11-12.5b	X	X
			Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.		L.11-12.6	X	X

Appendix B

AP Calculus, AP Statistics, and AP Computer Science A — Common Core State Standards Side-by-Side Alignment Table

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
6	Ratios and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.		6.RP.1	X	X	X	X
6	Ratios and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship.		6.RP.2	X	X	X	X
6	Ratios and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.	Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.	6.RP.3a	X	X	X	X
6	Ratios and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.	Solve unit rate problems including those involving unit pricing and constant speed.	6.RP.3b	X	X	X	X
6	Ratios and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.	Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.	6.RP.3c	X	X	X	X
6	Ratios and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.	6.RP.3d	X	X	X	X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
6	The Number System	Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.		6.NS.1	X	X	X	X
6	The Number System	Compute fluently with multi-digit numbers and find common factors and multiples.	Fluently divide multi-digit numbers using the standard algorithm.		6.NS.2	X	X	X	X
6	The Number System	Compute fluently with multi-digit numbers and find common factors and multiples.	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.		6.NS.3	X	X	X	X
6	The Number System	Compute fluently with multi-digit numbers and find common factors and multiples.	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.		6.NS.4	X	X		X
6	The Number System	Apply and extend previous understandings of numbers to the system of rational numbers.	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.		6.NS.5	X	X	X	X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
6	The Number System	Apply and extend previous understandings of numbers to the system of rational numbers.	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.	Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.	6.NS.6a	X	X	X	X
6	The Number System	Apply and extend previous understandings of numbers to the system of rational numbers.	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.	Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.	6.NS.6b	X	X	X	X
6	The Number System	Apply and extend previous understandings of numbers to the system of rational numbers.	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.	Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.	6.NS.6c	X	X	X	X
6	The Number System	Apply and extend previous understandings of numbers to the system of rational numbers.	Understand ordering and absolute value of rational numbers.	Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.	6.NS.7a	X	X		X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
6	The Number System	Apply and extend previous understandings of numbers to the system of rational numbers.	Understand ordering and absolute value of rational numbers.	Write, interpret, and explain statements of order for rational numbers in real-world contexts.	6.NS.7b	X	X	X	X
6	The Number System	Apply and extend previous understandings of numbers to the system of rational numbers.	Understand ordering and absolute value of rational numbers.	Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.	6.NS.7c	X	X	X	X
6	The Number System	Apply and extend previous understandings of numbers to the system of rational numbers.	Understand ordering and absolute value of rational numbers.	Distinguish comparisons of absolute value from statements about order.	6.NS.7d	X	X		
6	The Number System	Apply and extend previous understandings of numbers to the system of rational numbers.	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.		6.NS.8	X	X	X	X
6	Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.	Write and evaluate numerical expressions involving whole-number exponents.		6.EE.1	X	X	X	X
6	Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.	Write, read, and evaluate expressions in which letters stand for numbers.	Write expressions that record operations with numbers and with letters standing for numbers.	6.EE.2a	X	X	X	X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
6	Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.	Write, read, and evaluate expressions in which letters stand for numbers.	Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.	6.EE.2b	X	X	X	X
6	Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.	Write, read, and evaluate expressions in which letters stand for numbers.	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).	6.EE.2c	X	X	X	X
6	Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.	Apply the properties of operations to generate equivalent expressions.		6.EE.3	X	X	X	X
6	Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).		6.EE.4	X	X	X	X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
6	Expressions and Equations	Reason about and solve one-variable equations and inequalities.	Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.		6.EE.5	X	X	X	X
6	Expressions and Equations	Reason about and solve one-variable equations and inequalities.	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.		6.EE.6	X	X	X	X
6	Expressions and Equations	Reason about and solve one-variable equations and inequalities.	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.		6.EE.7	X	X	X	X
6	Expressions and Equations	Reason about and solve one-variable equations and inequalities.	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.		6.EE.8	X	X	X	X
6	Expressions and Equations	Represent and analyze quantitative relationships between dependent and independent variables.	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.		6.EE.9	X	X	X	X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
6	Geometry	Solve real-world and mathematical problems involving area, surface area, and volume.	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.		6.G.1	X	X		X
6	Geometry	Solve real-world and mathematical problems involving area, surface area, and volume.	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.		6.G.2	X	X		
6	Geometry	Solve real-world and mathematical problems involving area, surface area, and volume.	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.		6.G.3	X	X		
6	Geometry	Solve real-world and mathematical problems involving area, surface area, and volume.	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.		6.G.4				
6	Statistics and Probability	Develop understanding of statistical variability.	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.		6.SP.1			X	

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
6	Statistics and Probability	Develop understanding of statistical variability.	Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.		6.SP.2			X	
6	Statistics and Probability	Develop understanding of statistical variability.	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.		6.SP.3			X	
6	Statistics and Probability	Summarize and describe distributions.	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.		6.SP.4			X	
6	Statistics and Probability	Summarize and describe distributions.	Summarize numerical data sets in relation to their context, such as by:	Reporting the number of observations.	6.SP.5a			X	
6	Statistics and Probability	Summarize and describe distributions.	Summarize numerical data sets in relation to their context, such as by:	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.	6.SP.5b			X	
6	Statistics and Probability	Summarize and describe distributions.	Summarize numerical data sets in relation to their context, such as by:	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.	6.SP.5c			X	
6	Statistics and Probability	Summarize and describe distributions.	Summarize numerical data sets in relation to their context, such as by:	Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	6.SP.5d			X	

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
7	Ratios and Proportional Relationships	Analyze proportional relationships and use them to solve real-world and mathematical problems.	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.		7.RP.1	X	X		
7	Ratios and Proportional Relationships	Analyze proportional relationships and use them to solve real-world and mathematical problems.	Recognize and represent proportional relationships between quantities.	Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.	7.RP.2a	X	X	X	
7	Ratios and Proportional Relationships	Analyze proportional relationships and use them to solve real-world and mathematical problems.	Recognize and represent proportional relationships between quantities.	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	7.RP.2b	X	X	X	
7	Ratios and Proportional Relationships	Analyze proportional relationships and use them to solve real-world and mathematical problems.	Recognize and represent proportional relationships between quantities.	Represent proportional relationships by equations.	7.RP.2c	X	X	X	
7	Ratios and Proportional Relationships	Analyze proportional relationships and use them to solve real-world and mathematical problems.	Recognize and represent proportional relationships between quantities.	Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.	7.RP.2d	X	X	X	

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
7	Ratios and Proportional Relationships	Analyze proportional relationships and use them to solve real-world and mathematical problems.	Use proportional relationships to solve multistep ratio and percent problems.		7.RP.3	X	X	X	
7	The Number System	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.	Describe situations in which opposite quantities combine to make 0.	7.NS.1a	X	X		X
7	The Number System	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.	Understand $p + q$ as the number located a distance $\|q\|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.	7.NS.1b	X	X	X	X
7	The Number System	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.	Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.	7.NS.1c	X	X	X	X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
7	The Number System	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.	Apply properties of operations as strategies to add and subtract rational numbers.	7.NS.1d	X	X	X	X
7	The Number System	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.	7.NS.2a	X	X	X	X
7	The Number System	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.	7.NS.2b	X	X	X	X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
7	The Number System	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	Apply properties of operations as strategies to multiply and divide rational numbers.	7.NS.2c	X	X	X	X
7	The Number System	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.	7.NS.2d	X	X	X	X
7	The Number System	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	Solve real-world and mathematical problems involving the four operations with rational numbers.		7.NS.3	X	X	X	X
7	Expressions and Equations	Use properties of operations to generate equivalent expressions.	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.		7.EE.1	X	X	X	X
7	Expressions and Equations	Use properties of operations to generate equivalent expressions.	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.		7.EE.2	X	X	X	X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
7	Expressions and Equations	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.		7.EE.3	X	X	X	X
7	Expressions and Equations	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.	Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.	7.EE.4a	X	X	X	X
7	Expressions and Equations	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.	Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.	7.EE.4b	X	X	X	X
7	Geometry	Draw, construct, and describe geometrical figures and describe the relationships between them.	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.		7.G.1	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
7	Geometry	Draw, construct, and describe geometrical figures and describe the relationships between them.	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.		7.G.2	X	X		
7	Geometry	Draw, construct, and describe geometrical figures and describe the relationships between them.	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.		7.G.3	X	X		
7	Geometry	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.		7.G.4	X	X		
7	Geometry	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.		7.G.5	X	X		
7	Geometry	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.		7.G.6	X	X		X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
7	Statistics and Probability	Use random sampling to draw inferences about a population.	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.		7.SP.1			X	
7	Statistics and Probability	Use random sampling to draw inferences about a population.	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.		7.SP.2			X	
7	Statistics and Probability	Draw informal comparative inferences about two populations.	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.		7.SP.3			X	
7	Statistics and Probability	Draw informal comparative inferences about two populations.	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.		7.SP.4			X	
7	Statistics and Probability	Investigate chance processes and develop, use, and evaluate probability models.	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.		7.SP.5			X	

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
7	Statistics and Probability	Investigate chance processes and develop, use, and evaluate probability models.	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.		7.SP.6			X	
7	Statistics and Probability	Investigate chance processes and develop, use, and evaluate probability models.	Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.	Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.	7.SP.7a			X	
7	Statistics and Probability	Investigate chance processes and develop, use, and evaluate probability models.	Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.	Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.	7.SP.7b			X	
7	Statistics and Probability	Investigate chance processes and develop, use, and evaluate probability models.	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.	Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.	7.SP.8a			X	
7	Statistics and Probability	Investigate chance processes and develop, use, and evaluate probability models.	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.	Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.	7.SP.8b			X	

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
7	Statistics and Probability	Investigate chance processes and develop, use, and evaluate probability models.	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.	Design and use a simulation to generate frequencies for compound events.	7.SP.8c			X	
8	The Number System	Know that there are numbers that are not rational, and approximate them by rational numbers.	Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.		8.NS.1	X	X	X	X
8	The Number System	Know that there are numbers that are not rational, and approximate them by rational numbers.	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2).		8.NS.2	X	X		X
8	Expressions and Equations	Work with radicals and integer exponents.	Know and apply the properties of integer exponents to generate equivalent numerical expressions.		8.EE.1	X	X	X	X
8	Expressions and Equations	Work with radicals and integer exponents.	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.		8.EE.2	X	X	X	X
8	Expressions and Equations	Work with radicals and integer exponents.	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.		8.EE.3	X	X	X	X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
8	Expressions and Equations	Work with radicals and integer exponents.	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.		8.EE.4	X	X		X
8	Expressions and Equations	Understand the connections between proportional relationships, lines, and linear equations.	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.		8.EE.5	X	X	X	
8	Expressions and Equations	Understand the connections between proportional relationships, lines, and linear equations.	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.		8.EE.6	X	X		
8	Expressions and Equations	Analyze and solve linear equations and pairs of simultaneous linear equations.	Solve linear equations in one variable.	Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).	8.EE.7a	X	X		X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
8	Expressions and Equations	Analyze and solve linear equations and pairs of simultaneous linear equations.	Solve linear equations in one variable.	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	8.EE.7b	X	X	X	X
8	Expressions and Equations	Analyze and solve linear equations and pairs of simultaneous linear equations.	Analyze and solve pairs of simultaneous linear equations.	Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.	8.EE.a	X	X	X	
8	Expressions and Equations	Analyze and solve linear equations and pairs of simultaneous linear equations.	Analyze and solve pairs of simultaneous linear equations.	Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.	8.EE.b	X	X	X	
8	Expressions and Equations	Analyze and solve linear equations and pairs of simultaneous linear equations.	Analyze and solve pairs of simultaneous linear equations.	Solve real-world and mathematical problems leading to two linear equations in two variables.	8.EE.c	X	X	X	
8	Functions	Define, evaluate, and compare functions.	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.		8.F.1	X	X	X	X
8	Functions	Define, evaluate, and compare functions.	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).		8.F.2	X	X	X	

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
8	Functions	Define, evaluate, and compare functions.	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.		8.F.3	X	X	X	X
8	Functions	Use functions to model relationships between quantities.	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.		8.F.4	X	X	X	X
8	Functions	Use functions to model relationships between quantities.	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.		8.F.5	X	X	X	
8	Geometry	Understand congruence and similarity using physical models, transparencies, or geometry software.	Verify experimentally the properties of rotations, reflections, and translations:	Lines are taken to lines, and line segments to line segments of the same length.	8.G.1a	X	X		
8	Geometry	Understand congruence and similarity using physical models, transparencies, or geometry software.	Verify experimentally the properties of rotations, reflections, and translations:	Angles are taken to angles of the same measure.	8.G.1b	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
8	Geometry	Understand congruence and similarity using physical models, transparencies, or geometry software.	Verify experimentally the properties of rotations, reflections, and translations:	Parallel lines are taken to parallel lines.	8.G.1c	X	X		
8	Geometry	Understand congruence and similarity using physical models, transparencies, or geometry software.	Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.		8.G.2	X	X		
8	Geometry	Understand congruence and similarity using physical models, transparencies, or geometry software.	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.		8.G.3	X	X		
8	Geometry	Understand congruence and similarity using physical models, transparencies, or geometry software.	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.		8.G.4	X	X		
8	Geometry	Understand congruence and similarity using physical models, transparencies, or geometry software.	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.		8.G.5	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
8	Geometry	Understand and apply the Pythagorean Theorem.	Explain a proof of the Pythagorean Theorem and its converse.		8.G.6	X	X		
8	Geometry	Understand and apply the Pythagorean Theorem.	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.		8.G.7	X	X		
8	Geometry	Understand and apply the Pythagorean Theorem.	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.		8.G.8	X	X		
8	Geometry	Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.		8.G.9	X	X		
8	Statistics and Probability	Investigate patterns of association in bivariate data.	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.		8.SP.1			X	
8	Statistics and Probability	Investigate patterns of association in bivariate data.	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.		8.SP.2	X	X	X	

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
8	Statistics and Probability	Investigate patterns of association in bivariate data.	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.		8.SP.3	X	X	X	
8	Statistics and Probability	Investigate patterns of association in bivariate data.	Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.		8.SP.4			X	
High School-Number and Quantity	The Real Number System	Extend the properties of exponents to rational exponents.	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.		N-RN.1	X	X	X	X
High School-Number and Quantity	The Real Number System	Extend the properties of exponents to rational exponents.	Rewrite expressions involving radicals and rational exponents using the properties of exponents.		N-RN.2	X	X	X	X
High School-Number and Quantity	The Real Number System	Use properties of rational and irrational numbers.	Explain why the sum or product of two rational numbers is 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.		N-RN.3	X	X		
High School-Number and Quantity	Quantities	Reason quantitatively and use units to solve problems.	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.		N-Q.1	X	X	X	X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Number and Quantity	Quantities	Reason quantitatively and use units to solve problems.	Define appropriate quantities for the purpose of descriptive modeling.		N-Q.2	X	X	X	
High School-Number and Quantity	Quantities	Reason quantitatively and use units to solve problems.	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.		N-Q.3	X	X	X	X
High School-Number and Quantity	The Complex Number System	Perform arithmetic operations with complex numbers.	Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.		N-CN.1	X	X		
High School-Number and Quantity	The Complex Number System	Perform arithmetic operations with complex numbers.	Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.		N-CN.2	X	X		
High School-Number and Quantity	The Complex Number System	Perform arithmetic operations with complex numbers.	(+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.		N-CN.3	X	X		
High School-Number and Quantity	The Complex Number System	Represent complex numbers and their operations on the complex plane.	(+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.		N-CN.4	X	X		
High School-Number and Quantity	The Complex Number System	Represent complex numbers and their operations on the complex plane.	(+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation.		N-CN.5	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Number and Quantity	The Complex Number System	Represent complex numbers and their operations on the complex plane.	(+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.		N-CN.6	X	X		
High School-Number and Quantity	The Complex Number System	Use complex numbers in polynomial identities and equations.	Solve quadratic equations with real coefficients that have complex solutions.		N-CN.7	X	X		
High School-Number and Quantity	The Complex Number System	Use complex numbers in polynomial identities and equations.	(+) Extend polynomial identities to the complex numbers.		N-CN.8	X	X		
High School-Number and Quantity	The Complex Number System	Use complex numbers in polynomial identities and equations.	(+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.		N-CN.9	X	X		
High School-Number and Quantity	Vector and Matrix Quantities	Represent and model with vector quantities.	(+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v, $\|v\|$, $\|\|v\|\|$, v).		N-VM.1		X		
High School-Number and Quantity	Vector and Matrix Quantities	Represent and model with vector quantities.	(+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.		N-VM.2		X		
High School-Number and Quantity	Vector and Matrix Quantities	Represent and model with vector quantities.	(+) Solve problems involving velocity and other quantities that can be represented by vectors.		N-VM.3		X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Number and Quantity	Vector and Matrix Quantities	Perform operations on vectors.	(+) Add and subtract vectors.	Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.	N-VM.4a		X		
High School-Number and Quantity	Vector and Matrix Quantities	Perform operations on vectors.	(+) Add and subtract vectors.	Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.	N-VM.4b		X		
High School-Number and Quantity	Vector and Matrix Quantities	Perform operations on vectors.	(+) Add and subtract vectors.	Understand vector subtraction $\boldsymbol{v} - \boldsymbol{w}$ as $\boldsymbol{v} + (-\boldsymbol{w})$, where $-\boldsymbol{w}$ is the additive inverse of $\boldsymbol{w}$, with the same magnitude as $\boldsymbol{w}$ and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.	N-VM.4c		X		
High School-Number and Quantity	Vector and Matrix Quantities	Perform operations on vectors.	(+) Multiply a vector by a scalar.	Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v^x, v^y) = (cv^x, cv^y)$.	N-VM.5a		X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Number and Quantity	Vector and Matrix Quantities	Perform operations on vectors.	(+) Multiply a vector by a scalar.	Compute the magnitude of a scalar multiple $c\mathbf{v}$ using $\|c\mathbf{v}\| = \|c\|\mathbf{v}$. Compute the direction of $c\mathbf{v}$ knowing that when $\|c\|\mathbf{v} \neq 0$, the direction of $c\mathbf{v}$ is either along $\mathbf{v}$ (for $c > 0$) or against $\mathbf{v}$ (for $c < 0$).	N-VM.5b		X		
High School-Number and Quantity	Vector and Matrix Quantities	Perform operations on matrices and use matrices in applications.	(+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.		N-VM.6	X	X		
High School-Number and Quantity	Vector and Matrix Quantities	Perform operations on matrices and use matrices in applications.	(+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.		N-VM.7	X	X		
High School-Number and Quantity	Vector and Matrix Quantities	Perform operations on matrices and use matrices in applications.	(+) Add, subtract, and multiply matrices of appropriate dimensions.		N-VM.8	X	X		
High School-Number and Quantity	Vector and Matrix Quantities	Perform operations on matrices and use matrices in applications.	(+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.		N-VM.9	X	X		
High School-Number and Quantity	Vector and Matrix Quantities	Perform operations on matrices and use matrices in applications.	(+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.		N-VM.10	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Number and Quantity	Vector and Matrix Quantities	Perform operations on matrices and use matrices in applications.	(+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.		N-VM.11	X	X		
High School-Number and Quantity	Vector and Matrix Quantities	Perform operations on matrices and use matrices in applications.	(+) Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.		N-VM.12	X	X		
High School-Algebra	Seeing Structure in Expressions	Interpret the structure of expressions	Interpret expressions that represent a quantity in terms of its context.	Interpret parts of an expression, such as terms, factors, and coefficients.	A-SSE.1a	X	X	X	X
High School-Algebra	Seeing Structure in Expressions	Interpret the structure of expressions	Interpret expressions that represent a quantity in terms of its context.	Interpret complicated expressions by viewing one or more of their parts as a single entity.	A-SSE.1b	X	X	X	X
High School-Algebra	Seeing Structure in Expressions	Interpret the structure of expressions	Use the structure of an expression to identify ways to rewrite it.		A-SSE.2	X	X	X	X
High School-Algebra	Seeing Structure in Expressions	Write expressions in equivalent forms to solve problems	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	Factor a quadratic expression to reveal the zeros of the function it defines.	A-SSE.3a	X	X		
High School-Algebra	Seeing Structure in Expressions	Write expressions in equivalent forms to solve problems	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	A-SSE.3b	X	X		
High School-Algebra	Seeing Structure in Expressions	Write expressions in equivalent forms to solve problems	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	Use the properties of exponents to transform expressions for exponential functions.	A-SSE.3c	X	X	X	X
High School-Algebra	Seeing Structure in Expressions	Write expressions in equivalent forms to solve problems	Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.		A-SSE.4	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Algebra	Arithmetic with Polynomials and Rational Expressions	Perform arithmetic operations on polynomials	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.		A-APR.1	X	X		
High School-Algebra	Arithmetic with Polynomials and Rational Expressions	Understand the relationship between zeros and factors of polynomials	Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.		A-APR.2	X	X		
High School-Algebra	Arithmetic with Polynomials and Rational Expressions	Understand the relationship between zeros and factors of polynomials	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.		A-APR.3	X	X		
High School-Algebra	Arithmetic with Polynomials and Rational Expressions	Use polynomial identities to solve problems	Prove polynomial identities and use them to describe numerical relationships.		A-APR.4	X	X		
High School-Algebra	Arithmetic with Polynomials and Rational Expressions	Use polynomial identities to solve problems	(+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.		A-APR.5	X	X	X	
High School-Algebra	Arithmetic with Polynomials and Rational Expressions	Rewrite rational expressions	Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.		A-APR.6	X	X		X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Algebra	Arithmetic with Polynomials and Rational Expressions	Rewrite rational expressions	(+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.		A-APR.7	X	X		X
High School-Algebra	Creating Equations	Create equations that describe numbers or relationships	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.		A-CED.1	X	X	X	X
High School-Algebra	Creating Equations	Create equations that describe numbers or relationships	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.		A-CED.2	X	X	X	X
High School-Algebra	Creating Equations	Create equations that describe numbers or relationships	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.		A-CED.3	X	X	X	X
High School-Algebra	Creating Equations	Create equations that describe numbers or relationships	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.		A-CED.4	X	X	X	X
High School-Algebra	Reasoning with Equations and Inequalities	Understand solving equations as a process of reasoning and explain the reasoning	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.		A-REI.1	X	X	X	X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Algebra	Reasoning with Equations and Inequalities	Understand solving equations as a process of reasoning and explain the reasoning	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.		A-REI.2	X	X	X	X
High School-Algebra	Reasoning with Equations and Inequalities	Solve equations and inequalities in one variable	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.		A-REI.3	X	X	X	X
High School-Algebra	Reasoning with Equations and Inequalities	Solve equations and inequalities in one variable	Solve quadratic equations in one variable.	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.	A-REI.4a	X	X		
High School-Algebra	Reasoning with Equations and Inequalities	Solve equations and inequalities in one variable	Solve quadratic equations in one variable.	Solve quadratic equations by inspection (e.g., for $x^2 = 49$), 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 $a \pm bi$ for real numbers a and b.	A-REI.4b	X	X		
High School-Algebra	Reasoning with Equations and Inequalities	Solve systems of equations	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.		A-REI.5	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Algebra	Reasoning with Equations and Inequalities	Solve systems of equations	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.		A-REI.6	X	X		
High School-Algebra	Reasoning with Equations and Inequalities	Solve systems of equations	Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.		A-REI.7	X	X		
High School-Algebra	Reasoning with Equations and Inequalities	Solve systems of equations	(+) Represent a system of linear equations as a single matrix equation in a vector variable.		A-REI.8	X	X		
High School-Algebra	Reasoning with Equations and Inequalities	Solve systems of equations	(+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3×3 or greater).		A-REI.9	X	X		
High School-Algebra	Reasoning with Equations and Inequalities	Represent and solve equations and inequalities graphically	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).		A-REI.10	X	X	X	
High School-Algebra	Reasoning with Equations and Inequalities	Represent and solve equations and inequalities graphically	Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.		A-REI.11	X	X	X	

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Algebra	Reasoning with Equations and Inequalities	Represent and solve equations and inequalities graphically	Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.		A-REI.12	X	X	X	
High School-Functions	Interpreting Functions	Understand the concept of a function and use function notation	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$.		F-IF.1	X	X	X	X
High School-Functions	Interpreting Functions	Understand the concept of a function and use function notation	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.		F-IF.2	X	X	X	X
High School-Functions	Interpreting Functions	Understand the concept of a function and use function notation	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.		F-IF.3	X	X	X	X
High School-Functions	Interpreting Functions	Interpret functions that arise in applications in terms of the context	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.		F-IF.4	X	X	X	

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Functions	Interpreting Functions	Interpret functions that arise in applications in terms of the context	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.		F-IF.5	X	X	X	X
High School-Functions	Interpreting Functions	Interpret functions that arise in applications in terms of the context	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.		F-IF.6	X	X	X	
High School-Functions	Interpreting Functions	Analyze functions using different representations	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.	Graph linear and quadratic functions and show intercepts, maxima, and minima.	F-IF.7a	X	X	X	
High School-Functions	Interpreting Functions	Analyze functions using different representations	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.	Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	F-IF.7b	X	X	X	
High School-Functions	Interpreting Functions	Analyze functions using different representations	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.	Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.	F-IF.7c	X	X	X	
High School-Functions	Interpreting Functions	Analyze functions using different representations	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.	(+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.	F-IF.7d	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Functions	Interpreting Functions	Analyze functions using different representations	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.	Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	F-IF.7e	X	X	X	
High School-Functions	Interpreting Functions	Analyze functions using different representations	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	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.	F-IF.8a	X	X	X	
High School-Functions	Interpreting Functions	Analyze functions using different representations	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	Use the properties of exponents to interpret expressions for exponential functions.	F-IF.8b	X	X	X	X
High School-Functions	Interpreting Functions	Analyze functions using different representations	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).		F-IF.9	X	X	X	
High School-Functions	Building Functions	Build a function that models a relationship between two quantities	Write a function that describes a relationship between two quantities.	Determine an explicit expression, a recursive process, or steps for calculation from a context.	F-BF.1a	X	X	X	X
High School-Functions	Building Functions	Build a function that models a relationship between two quantities	Write a function that describes a relationship between two quantities.	Combine standard function types using arithmetic operations.	F-BF.1b	X	X	X	X
High School-Functions	Building Functions	Build a function that models a relationship between two quantities	Write a function that describes a relationship between two quantities.	(+) Compose functions.	F-BF.1c	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Functions	Building Functions	Build a function that models a relationship between two quantities	Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.		F-BF.2	X	X		
High School-Functions	Building Functions	Build new functions from existing functions	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.		F-BF.3	X	X	X	
High School-Functions	Building Functions	Build new functions from existing functions	Find inverse functions.	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.	F-BF.4a	X	X	X	
High School-Functions	Building Functions	Build new functions from existing functions	Find inverse functions.	(+) Verify by composition that one function is the inverse of another.	F-BF.4b	X	X		
High School-Functions	Building Functions	Build new functions from existing functions	Find inverse functions.	(+) Read values of an inverse function from a graph or a table, given that the function has an inverse.	F-BF.4c	X	X		
High School-Functions	Building Functions	Build new functions from existing functions	Find inverse functions.	(+) Produce an invertible function from a non-invertible function by restricting the domain.	F-BF.4d	X	X		
High School-Functions	Building Functions	Build new functions from existing functions	(+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.		F-BF.5	X	X	X	

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Functions	Linear, Quadratic, and Exponential Models	Construct and compare linear, quadratic, and exponential models and solve problems	Distinguish between situations that can be modeled with linear functions and with exponential functions.	Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.	F-LE.1a	X	X	X	
High School-Functions	Linear, Quadratic, and Exponential Models	Construct and compare linear, quadratic, and exponential models and solve problems	Distinguish between situations that can be modeled with linear functions and with exponential functions.	Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	F-LE.1b	X	X	X	X
High School-Functions	Linear, Quadratic, and Exponential Models	Construct and compare linear, quadratic, and exponential models and solve problems	Distinguish between situations that can be modeled with linear functions and with exponential functions.	Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	F-LE.1c	X	X	X	X
High School-Functions	Linear, Quadratic, and Exponential Models	Construct and compare linear, quadratic, and exponential models and solve problems	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).		F-LE.2	X	X	X	X
High School-Functions	Linear, Quadratic, and Exponential Models	Construct and compare linear, quadratic, and exponential models and solve problems	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.		F-LE.3	X	X	X	
High School-Functions	Linear, Quadratic, and Exponential Models	Construct and compare linear, quadratic, and exponential models and solve problems	For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.		F-LE.4	X	X	X	X

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Functions	Linear, Quadratic, and Exponential Models*	Interpret expressions for functions in terms of the situation they model	Interpret the parameters in a linear or exponential function in terms of a context.		F-LE.5	X	X	X	
High School-Functions	Trigonometric Functions	Extend the domain of trigonometric functions using the unit circle	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.		F-TF.1	X	X		
High School-Functions	Trigonometric Functions	Extend the domain of trigonometric functions using the unit circle	Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.		F-TF.2	X	X		
High School-Functions	Trigonometric Functions	Extend the domain of trigonometric functions using the unit circle	(+) Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for $\pi-x$, $\pi+x$, and $2\pi-x$ in terms of their values for x, where x is any real number.		F-TF.3	X	X		
High School-Functions	Trigonometric Functions	Extend the domain of trigonometric functions using the unit circle	(+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.		F-TF.4	X	X		
High School-Functions	Trigonometric Functions	Model periodic phenomena with trigonometric functions	Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.		F-TF.5	X	X		
High School-Functions	Trigonometric Functions	Model periodic phenomena with trigonometric functions	(+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.		F-TF.6	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Functions	Trigonometric Functions	Model periodic phenomena with trigonometric functions	(+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.		F-TF.7	X	X		
High School-Functions	Trigonometric Functions	Prove and apply trigonometric identities	Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to calculate trigonometric ratios.		F-TF.8	X	X		
High School-Functions	Trigonometric Functions	Prove and apply trigonometric identities	(+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.		F-TF.9	X	X		
High School-Geometry	Congruence	Experiment with transformations in the plane	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.		G-CO.1	X	X		
High School-Geometry	Congruence	Experiment with transformations in the plane	Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).		G-CO.2	X	X		
High School-Geometry	Congruence	Experiment with transformations in the plane	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.		G-CO.3	X	X		
High School-Geometry	Congruence	Experiment with transformations in the plane	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.		G-CO.4	X	X		

Common Core State Standards						AP Course			
Grade	**Domain**	**Cluster**	**Standard**	**Skill**	**Code**	**AP Calculus AB**	**AP Calculus BC**	**AP Statistics**	**AP Computer Science**
High School-Geometry	Congruence	Experiment with transformations in the plane	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.		G-CO.5	X	X		
High School-Geometry	Congruence	Understand congruence in terms of rigid motions	Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.		G-CO.6	X	X		
High School-Geometry	Congruence	Understand congruence in terms of rigid motions	Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.		G-CO.7	X	X		
High School-Geometry	Congruence	Understand congruence in terms of rigid motions	Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.		G-CO.8	X	X		
High School-Geometry	Congruence	Prove geometric theorems	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.*		G-CO.9	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Geometry	Congruence	Prove geometric theorems	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.*		G-CO.10	X	X		
High School-Geometry	Congruence	Prove geometric theorems	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.*		G-CO.11	X	X		
High School-Geometry	Congruence	Make geometric constructions	Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*		G-CO.12	X	X		
High School-Geometry	Congruence	Make geometric constructions	Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.		G-CO.13	X	X		
High School-Geometry	Similarity, Right Triangles, and Trigonometry	Understand similarity in terms of similarity transformations	Verify experimentally the properties of dilations given by a center and a scale factor:	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.	G-SRT.1a	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Geometry	Similarity, Right Triangles, and Trigonometry	Understand similarity in terms of similarity transformations	Verify experimentally the properties of dilations given by a center and a scale factor:	The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	G-SRT.1b	X	X		
High School-Geometry	Similarity, Right Triangles, and Trigonometry	Understand similarity in terms of similarity transformations	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.		G-SRT.2	X	X		
High School-Geometry	Similarity, Right Triangles, and Trigonometry	Understand similarity in terms of similarity transformations	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.		G-SRT.3	X	X		
High School-Geometry	Similarity, Right Triangles, and Trigonometry	Prove theorems involving similarity	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.*		G-SRT.4	X	X		
High School-Geometry	Similarity, Right Triangles, and Trigonometry	Prove theorems involving similarity	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.		G-SRT.5	X	X		
High School-Geometry	Similarity, Right Triangles, and Trigonometry	Define trigonometric ratios and solve problems involving right triangles	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.		G-SRT.6	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Geometry	Similarity, Right Triangles, and Trigonometry	Define trigonometric ratios and solve problems involving right triangles	Explain and use the relationship between the sine and cosine of complementary angles.		G-SRT.7	X	X		
High School-Geometry	Similarity, Right Triangles, and Trigonometry	Define trigonometric ratios and solve problems involving right triangles	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.		G-SRT.8	X	X		
High School-Geometry	Similarity, Right Triangles, and Trigonometry	Apply trigonometry to general triangles	(+) Derive the formula $A = 1/2\ ab$ sin(C) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.		G-SRT.9	X	X		
High School-Geometry	Similarity, Right Triangles, and Trigonometry	Apply trigonometry to general triangles	(+) Prove the Laws of Sines and Cosines and use them to solve problems.		G-SRT.10	X	X		
High School-Geometry	Similarity, Right Triangles, and Trigonometry	Apply trigonometry to general triangles	(+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).		G-SRT.11	X	X		
High School-Geometry	Circles	Understand and apply theorems about circles	Prove that all circles are similar.		G-C.1	X	X		
High School-Geometry	Circles	Understand and apply theorems about circles	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.		G-C.2	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Geometry	Circles	Understand and apply theorems about circles	Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.		G-C.3	X	X		
High School-Geometry	Circles	Understand and apply theorems about circles	(+) Construct a tangent line from a point outside a given circle to the circle.		G-C.4	X	X		
High School-Geometry	Circles	Find arc lengths and areas of sectors of circles	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.		G-C.5	X	X		
High School-Geometry	Expressing Geometric Properties Equations	Translate between the geometric description and the equation for a conic section	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.		G-GPE.1	X	X		
High School-Geometry	Expressing Geometric Properties Equations	Translate between the geometric description and the equation for a conic section	Derive the equation of a parabola given a focus and directrix.		G-GPE.2	X	X		
High School-Geometry	Expressing Geometric Properties Equations	Translate between the geometric description and the equation for a conic section	(+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.		G-GPE.3	X	X		
High School-Geometry	Expressing Geometric Properties Equations	Use coordinates to prove simple geometric theorems algebraically	Use coordinates to prove simple geometric theorems algebraically.		G-GPE.4	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Geometry	Expressing Geometric Properties Equations	Use coordinates to prove simple geometric theorems algebraically	Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).		G-GPE.5	X	X		
High School-Geometry	Expressing Geometric Properties Equations	Use coordinates to prove simple geometric theorems algebraically	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.		G-GPE.6	X	X		
High School-Geometry	Expressing Geometric Properties Equations	Use coordinates to prove simple geometric theorems algebraically	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.		G-GPE.7	X	X		
High School-Geometry	Geometric Measurement and Dimension	Explain volume formulas and use them to solve problems	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.*		G-GMD.1	X	X		
High School-Geometry	Geometric Measurement and Dimension	Explain volume formulas and use them to solve problems	(+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.		G-GMD.2	X	X		
High School-Geometry	Geometric Measurement and Dimension	Explain volume formulas and use them to solve problems	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.		G-GMD.3	X	X		
High School-Geometry	Geometric Measurement and Dimension	Visualize relationships between two-dimensional and three-dimensional objects	Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.		G-GMD.4	X	X		

Common Core State Standards						AP Course			
Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Geometry	Modeling with Geometry	Apply geometric concepts in modeling situations	Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).		G-MG.1	X	X		
High School-Geometry	Modeling with Geometry	Apply geometric concepts in modeling situations	Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).		G-MG.2	X	X		
High School-Geometry	Modeling with Geometry	Apply geometric concepts in modeling situations	Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).		G-MG.3	X	X		
High School-Statistics and Probability	Interpreting Categorical and Quantitative Data	Summarize, represent, and interpret data on a single count or measurement variable.	Represent data with plots on the real number line (dot plots, histograms, and box plots).		S-ID.1			X	
High School-Statistics and Probability	Interpreting Categorical and Quantitative Data	Summarize, represent, and interpret data on a single count or measurement variable.	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.		S-ID.2			X	
High School-Statistics and Probability	Interpreting Categorical and Quantitative Data	Summarize, represent, and interpret data on a single count or measurement variable.	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).		S-ID.3			X	

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High School-Statistics and Probability	Interpreting Categorical and Quantitative Data	Summarize, represent, and interpret data on a single count or measurement variable.	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.		S-ID.4			X	
High School-Statistics and Probability	Interpreting Categorical and Quantitative Data	Summarize, represent, and interpret data on two categorical and quantitative variables.	Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.		S-ID.5			X	
High School-Statistics and Probability	Interpreting Categorical and Quantitative Data	Summarize, represent, and interpret data on two categorical and quantitative variables.	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	Fit a function to the data; use functions fitted to data to solve problems in the context of the data. *Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.*	S-ID.6a	X	X	X	
High School-Statistics and Probability	Interpreting Categorical and Quantitative Data	Summarize, represent, and interpret data on two categorical and quantitative variables.	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	Informally assess the fit of a function by plotting and analyzing residuals.	S-ID.6b	X	X	X	
High School-Statistics and Probability	Interpreting Categorical and Quantitative Data	Summarize, represent, and interpret data on two categorical and quantitative variables.	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	Fit a linear function for a scatter plot that suggests a linear association.	S-ID.6c	X	X	X	

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Grade	Domain	Cluster	Standard	Skill	Code	AP Calculus AB	AP Calculus BC	AP Statistics	AP Computer Science
High School-Statistics and Probability	Interpreting Categorical and Quantitative Data	Interpret linear models	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.		S-ID.7	X	X	X	
High School-Statistics and Probability	Interpreting Categorical and Quantitative Data	Interpret linear models	Compute (using technology) and interpret the correlation coefficient of a linear fit.		S-ID.8	X	X	X	
High School-Statistics and Probability	Interpreting Categorical and Quantitative Data	Interpret linear models	Distinguish between correlation and causation.		S-ID.9			X	
High School-Statistics and Probability	Making Inferences and Justifying Conclusions	Understand and evaluate random processes underlying statistical experiments	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.		S-IC.1			X	
High School-Statistics and Probability	Making Inferences and Justifying Conclusions	Understand and evaluate random processes underlying statistical experiments	Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.		S-IC.2			X	
High School-Statistics and Probability	Making Inferences and Justifying Conclusions	Make inferences and justify conclusions from sample surveys, experiments, and observational studies	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.		S-IC.3			X	

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High School-Statistics and Probability	Making Inferences and Justifying Conclusions	Make inferences and justify conclusions from sample surveys, experiments, and observational studies	Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.		S-IC.4			X	
High School-Statistics and Probability	Making Inferences and Justifying Conclusions	Make inferences and justify conclusions from sample surveys, experiments, and observational studies	Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.		S-IC.5			X	
High School-Statistics and Probability	Making Inferences and Justifying Conclusions	Make inferences and justify conclusions from sample surveys, experiments, and observational studies	Evaluate reports based on data.		S-IC.6			X	
High School-Statistics and Probability	Conditional Probability and the Rules of Probability	Understand independence and conditional probability and use them to interpret data	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").		S-CP.1			X	
High School-Statistics and Probability	Conditional Probability and the Rules of Probability	Understand independence and conditional probability and use them to interpret data	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.		S-CP.2			X	

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High School-Statistics and Probability	Conditional Probability and the Rules of Probability	Understand independence and conditional probability and use them to interpret data	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*.		S-CP.3			X	
High School-Statistics and Probability	Conditional Probability and the Rules of Probability	Understand independence and conditional probability and use them to interpret data	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.		S-CP.4			X	
High School-Statistics and Probability	Conditional Probability and the Rules of Probability	Understand independence and conditional probability and use them to interpret data	Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.		S-CP.5			X	
High School-Statistics and Probability	Conditional Probability and the Rules of Probability	Use the rules of probability to compute probabilities of compound events in a uniform probability model	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.		S-CP.6			X	
High School-Statistics and Probability	Conditional Probability and the Rules of Probability	Use the rules of probability to compute probabilities of compound events in a uniform probability model	Apply the Addition Rule, *P*(*A* or *B*) = *P*(*A*) + *P*(*B*) – *P*(*A* and *B*), and interpret the answer in terms of the model.		S-CP.7			X	

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High School-Statistics and Probability	Conditional Probability and the Rules of Probability	Use the rules of probability to compute probabilities of compound events in a uniform probability model	(+) 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.		S-CP.8			X	
High School-Statistics and Probability	Conditional Probability and the Rules of Probability	Use the rules of probability to compute probabilities of compound events in a uniform probability model	(+) Use permutations and combinations to compute probabilities of compound events and solve problems.		S-CP.9			X	
High School-Statistics and Probability	Using Probability to Make Decisions	Calculate expected values and use them to solve problems	(+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.		S-MD.1			X	
High School-Statistics and Probability	Using Probability to Make Decisions	Calculate expected values and use them to solve problems	(+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.		S-MD.2			X	
High School-Statistics and Probability	Using Probability to Make Decisions	Calculate expected values and use them to solve problems	(+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value.		S-MD.3			X	
High School-Statistics and Probability	Using Probability to Make Decisions	Calculate expected values and use them to solve problems	(+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value.		S-MD.4			X	

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High School-Statistics and Probability	Using Probability to Make Decisions	Use probability to evaluate outcomes of decisions	(+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.	Find the expected payoff for a game of chance.	S-MD.5a			X	
High School-Statistics and Probability	Using Probability to Make Decisions	Use probability to evaluate outcomes of decisions	(+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.	Evaluate and compare strategies on the basis of expected values.	S-MD.5b			X	
High School-Statistics and Probability	Using Probability to Make Decisions	Use probability to evaluate outcomes of decisions	(+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).		S-MD.6			X	
High School-Statistics and Probability	Using Probability to Make Decisions	Use probability to evaluate outcomes of decisions	(+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).		S-MD.7			X	

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