

Texas Essential Knowledge and Skills (TEKS) Breakouts		
Subject	Chapter 111. Mathematics	
Subchapter	Subchapter C. High School	
Course	§111.42. Precalculus, Adopted 2012 (One-Half to One Credit).	
(a) General requirements. Students shall be awarded one-half to one credit for successful completion of this course. Prerequisites: Algebra I, Geometry, and Algebra II.		
(b) Introduction.		
(1) The desire to achieve educational excellence is the driving force behind the Texas essential knowledge and skills for mathematics, guided by the college and career readiness standards. By embedding statistics, probability, and finance, while focusing on fluency and solid understanding, Texas will lead the way in mathematics education and prepare all Texas students for the challenges they will face in the 21st century.		
(2) The process standards describe ways in which students are expected to engage in the content. The placement of the process standards at the beginning of the knowledge and skills listed for each grade and course is intentional. The process standards weave the other knowledge and skills together so that students may be successful problem solvers and use mathematics efficiently and effectively in daily life. The process standards are integrated at every grade level and course. When possible, students will apply mathematics to problems arising in everyday life, society, and the workplace. Students will use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution. Students will select appropriate tools such as real objects, manipulatives, paper and pencil, and technology and techniques such as mental math, estimation, and number sense to solve problems. Students will effectively communicate mathematical ideas, reasoning, and their implications using multiple representations such as symbols, diagrams, graphs, and language. Students will use mathematical relationships to generate solutions and make connections and predictions. Students will analyze mathematical relationships to connect and communicate mathematical ideas. Students will display, explain, or justify mathematical ideas and arguments using precise mathematical language in written or oral communication.		
(3) Precalculus is the preparation for calculus. The course approaches topics from a function point of view, where appropriate, and is designed to strengthen and enhance conceptual understanding and mathematical reasoning used when modeling and solving mathematical and real-world problems. Students systematically work with functions and their multiple representations. The study of Precalculus deepens students' mathematical understanding and fluency with algebra and trigonometry and extends their ability to make connections and apply concepts and procedures at higher levels. Students investigate and explore mathematical ideas, develop multiple strategies for analyzing complex situations, and use technology to build understanding, make connections between representations, and provide support in solving problems.		
(4) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.		
(c) Knowledge and Skills.		
Knowledge and Skills Statement	Student Expectation	Breakout

Knowledge and Skills Statement	Student Expectation	Breakout
(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:	(A) apply mathematics to problems arising in everyday life, society, and the workplace	(i) apply mathematics to problems arising in everyday life
(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:	(A) apply mathematics to problems arising in everyday life, society, and the workplace	(ii) apply mathematics to problems arising in society
(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:	(A) apply mathematics to problems arising in everyday life, society, and the workplace	(iii) apply mathematics to problems arising in the workplace

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<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution</p>	<p>(i) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution</p>	<p>(ii) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the reasonableness of the solution</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems</p>	<p>(i) select tools, including real objects as appropriate, to solve problems</p>

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<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems</p>	<p>(ii) select tools, including manipulatives as appropriate, to solve problems</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems</p>	<p>(iii) select tools, including paper and pencil as appropriate, to solve problems</p>

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<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems</p>	<p>(iv) select tools, including technology as appropriate, to solve problems</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems</p>	<p>(v) select techniques, including mental math as appropriate, to solve problems</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems</p>	<p>(vi) select techniques including estimation as appropriate, to solve problems</p>

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<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems</p>	<p>(vii) select techniques, including number sense as appropriate, to solve problems</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(i) communicate mathematical ideas using multiple representations, including symbols as appropriate</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(ii) communicate mathematical ideas using multiple representations, including diagrams as appropriate</p>

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<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(iii) communicate mathematical ideas using multiple representations, including graphs as appropriate</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(iv) communicate mathematical ideas using multiple representations, including language as appropriate</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(v) communicate mathematical reasoning using multiple representations, including symbols as appropriate</p>

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<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(vi) communicate mathematical reasoning using multiple representations, including diagrams as appropriate</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(vii) communicate mathematical reasoning using multiple representations, including graphs as appropriate</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(viii) communicate mathematical reasoning using multiple representations, including language as appropriate</p>

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<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(ix) communicate [mathematical ideas'] implications using multiple representations, including symbols as appropriate</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(x) communicate [mathematical ideas'] implications using multiple representations, including diagrams as appropriate</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(xi) communicate [mathematical ideas'] implications using multiple representations, including graphs as appropriate</p>

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<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(xii) communicate [mathematical ideas'] implications using multiple representations, including language as appropriate</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(xiii) communicate [mathematical reasoning's] implications using multiple representations, including symbols as appropriate</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(xiv) communicate [mathematical reasoning's] implications using multiple representations, including diagrams as appropriate</p>

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<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(xv) communicate [mathematical reasoning's] implications using multiple representations, including graphs as appropriate</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate</p>	<p>(xvi) communicate [mathematical reasoning's] implications using multiple representations, including language as appropriate</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(E) create and use representations to organize, record, and communicate mathematical ideas</p>	<p>(i) create representations to organize mathematical ideas</p>

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<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(E) create and use representations to organize, record, and communicate mathematical ideas</p>	<p>(ii) create representations to record mathematical ideas</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(E) create and use representations to organize, record, and communicate mathematical ideas</p>	<p>(iii) create representations to communicate mathematical ideas</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(E) create and use representations to organize, record, and communicate mathematical ideas</p>	<p>(iv) use representations to organize mathematical ideas</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(E) create and use representations to organize, record, and communicate mathematical ideas</p>	<p>(v) use representations to record mathematical ideas</p>

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<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(E) create and use representations to organize, record, and communicate mathematical ideas</p>	<p>(vi) use representations to communicate mathematical ideas</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(F) analyze mathematical relationships to connect and communicate mathematical ideas</p>	<p>(i) analyze mathematical relationships to connect mathematical ideas</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(F) analyze mathematical relationships to connect and communicate mathematical ideas</p>	<p>(ii) analyze mathematical relationships to communicate mathematical ideas</p>
<p>(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:</p>	<p>(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication</p>	<p>(i) display mathematical ideas using precise mathematical language in written or oral communication</p>

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(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:	(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication	(ii) display mathematical arguments using precise mathematical language in written or oral communication
(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:	(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication	(iii) explain mathematical ideas using precise mathematical language in written or oral communication
(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:	(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication	(iv) explain mathematical arguments using precise mathematical language in written or oral communication

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(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:	(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication	(v) justify mathematical ideas using precise mathematical language in written or oral communication
(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:	(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication	(vi) justify mathematical arguments using precise mathematical language in written or oral communication
(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:	(A) use the composition of two functions to model and solve real-world problems	(i) use the composition of two functions to model real-world problems

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<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(A) use the composition of two functions to model and solve real-world problems</p>	<p>(ii) use the composition of two functions to solve real-world problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(B) demonstrate that function composition is not always commutative</p>	<p>(i) demonstrate that function composition is not always commutative</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(C) represent a given function as a composite function of two or more functions</p>	<p>(i) represent a given function as a composite function of two or more functions</p>

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<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(D) describe symmetry of graphs of even and odd functions</p>	<p>(i) describe symmetry of graphs of even functions</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(D) describe symmetry of graphs of even and odd functions</p>	<p>(ii) describe symmetry of graphs of odd functions</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(E) determine an inverse function, when it exists, for a given function over its domain or a subset of its domain and represent the inverse using multiple representations</p>	<p>(i) determine an inverse function, when it exists, for a given function over its domain or a subset of its domain</p>

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<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(E) determine an inverse function, when it exists, for a given function over its domain or a subset of its domain and represent the inverse using multiple representations</p>	<p>(ii) represent the inverse using multiple representations</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(F) graph exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise defined functions, including step functions</p>	<p>(i) graph exponential functions</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(F) graph exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise defined functions, including step functions</p>	<p>(ii) graph logarithmic functions</p>

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<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(F) graph exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise defined functions, including step functions</p>	<p>(iii) graph rational functions</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(F) graph exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise defined functions, including step functions</p>	<p>(iv) graph polynomial functions</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(F) graph exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise defined functions, including step functions</p>	<p>(v) graph power functions</p>

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<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(F) graph exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise defined functions, including step functions</p>	<p>(vi) graph trigonometric functions</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(F) graph exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise defined functions, including step functions</p>	<p>(vii) graph inverse trigonometric functions</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(F) graph exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise defined functions, including step functions</p>	<p>(viii) graph piecewise defined functions, including step functions</p>

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<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(G) graph functions, including exponential, logarithmic, sine, cosine, rational, polynomial, and power functions and their transformations, including $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d, in mathematical and real-world problems</p>	<p>(i) graph functions, including exponential functions, in mathematical problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(G) graph functions, including exponential, logarithmic, sine, cosine, rational, polynomial, and power functions and their transformations, including $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d, in mathematical and real-world problems</p>	<p>(ii) graph functions, including exponential functions, in real-world problems</p>

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<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(G) graph functions, including exponential, logarithmic, sine, cosine, rational, polynomial, and power functions and their transformations, including $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d, in mathematical and real-world problems</p>	<p>(iii) graph functions, including logarithmic functions, in mathematical problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(G) graph functions, including exponential, logarithmic, sine, cosine, rational, polynomial, and power functions and their transformations, including $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d, in mathematical and real-world problems</p>	<p>(iv) graph functions, including logarithmic functions, in real-world problems</p>

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<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(G) graph functions, including exponential, logarithmic, sine, cosine, rational, polynomial, and power functions and their transformations, including $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d, in mathematical and real-world problems</p>	<p>(v) graph functions, including sine functions, in mathematical problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(G) graph functions, including exponential, logarithmic, sine, cosine, rational, polynomial, and power functions and their transformations, including $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d, in mathematical and real-world problems</p>	<p>(vi) graph functions, including sine functions, in real-world problems</p>

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<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(G) graph functions, including exponential, logarithmic, sine, cosine, rational, polynomial, and power functions and their transformations, including $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d, in mathematical and real-world problems</p>	<p>(vii) graph functions, including cosine functions, in mathematical problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(G) graph functions, including exponential, logarithmic, sine, cosine, rational, polynomial, and power functions and their transformations, including $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d, in mathematical and real-world problems</p>	<p>(viii) graph functions, including cosine functions, in real-world problems</p>

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<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(G) graph functions, including exponential, logarithmic, sine, cosine, rational, polynomial, and power functions and their transformations, including $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d, in mathematical and real-world problems</p>	<p>(ix) graph functions, including rational functions, in mathematical problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(G) graph functions, including exponential, logarithmic, sine, cosine, rational, polynomial, and power functions and their transformations, including $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d, in mathematical and real-world problems</p>	<p>(x) graph functions, including rational functions, in real-world problems</p>

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<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(H) graph $\arcsin x$ and $\arccos x$ and describe the limitations on the domain</p>	<p>(i) graph $\arcsin x$</p>

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<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(I) determine and analyze the key features of exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise defined functions, including step functions such as domain, range, symmetry, relative maximum, relative minimum, zeros, asymptotes, and intervals over which the function is increasing or decreasing</p>	<p>(i) determine the key features of exponential functions</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(I) determine and analyze the key features of exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise defined functions, including step functions such as domain, range, symmetry, relative maximum, relative minimum, zeros, asymptotes, and intervals over which the function is increasing or decreasing</p>	<p>(ii) determine the key features of logarithmic functions</p>

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<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(I) determine and analyze the key features of exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise defined functions, including step functions such as domain, range, symmetry, relative maximum, relative minimum, zeros, asymptotes, and intervals over which the function is increasing or decreasing</p>	<p>(viii) determine the key features of piecewise defined functions, including step functions</p>

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<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(J) analyze and describe end behavior of functions, including exponential, logarithmic, rational, polynomial, and power functions, using infinity notation to communicate this characteristic in mathematical and real-world problems</p>	<p>(xiv) describe end behavior of functions, including logarithmic functions, using infinity notation to communicate this characteristic in real-world problems</p>

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<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(J) analyze and describe end behavior of functions, including exponential, logarithmic, rational, polynomial, and power functions, using infinity notation to communicate this characteristic in mathematical and real-world problems</p>	<p>(xv) describe end behavior of functions, including rational functions, using infinity notation to communicate this characteristic in mathematical problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(J) analyze and describe end behavior of functions, including exponential, logarithmic, rational, polynomial, and power functions, using infinity notation to communicate this characteristic in mathematical and real-world problems</p>	<p>(xvi) describe end behavior of functions, including rational functions, using infinity notation to communicate this characteristic in real-world problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(J) analyze and describe end behavior of functions, including exponential, logarithmic, rational, polynomial, and power functions, using infinity notation to communicate this characteristic in mathematical and real-world problems</p>	<p>(xvii) describe end behavior of functions, including polynomial functions, using infinity notation to communicate this characteristic in mathematical problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(J) analyze and describe end behavior of functions, including exponential, logarithmic, rational, polynomial, and power functions, using infinity notation to communicate this characteristic in mathematical and real-world problems</p>	<p>(xviii) describe end behavior of functions, including polynomial functions, using infinity notation to communicate this characteristic in real-world problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(J) analyze and describe end behavior of functions, including exponential, logarithmic, rational, polynomial, and power functions, using infinity notation to communicate this characteristic in mathematical and real-world problems</p>	<p>(xix) describe end behavior of functions, including power functions, using infinity notation to communicate this characteristic in mathematical problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(J) analyze and describe end behavior of functions, including exponential, logarithmic, rational, polynomial, and power functions, using infinity notation to communicate this characteristic in mathematical and real-world problems</p>	<p>(xx) describe end behavior of functions, including power functions, using infinity notation to communicate this characteristic in real-world problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(K) analyze characteristics of rational functions and the behavior of the function around the asymptotes, including horizontal, vertical, and oblique asymptotes</p>	<p>(i) analyze characteristics of rational functions</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(K) analyze characteristics of rational functions and the behavior of the function around the asymptotes, including horizontal, vertical, and oblique asymptotes</p>	<p>(ii) analyze the behavior of the function around the asymptotes, including horizontal asymptotes</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(K) analyze characteristics of rational functions and the behavior of the function around the asymptotes, including horizontal, vertical, and oblique asymptotes</p>	<p>(iii) analyze the behavior of the function around the asymptotes, including vertical asymptotes</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(K) analyze characteristics of rational functions and the behavior of the function around the asymptotes, including horizontal, vertical, and oblique asymptotes</p>	<p>(iv) analyze the behavior of the function around the asymptotes, including oblique asymptotes</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(L) determine various types of discontinuities in the interval $(-\infty, \infty)$ as they relate to functions and explore the limitations of the graphing calculator as it relates to the behavior of the function around discontinuities</p>	<p>(i) determine various types of discontinuities in the interval $(-\infty, \infty)$ as they relate to functions</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(L) determine various types of discontinuities in the interval $(-\infty, \infty)$ as they relate to functions and explore the limitations of the graphing calculator as it relates to the behavior of the function around discontinuities</p>	<p>(ii) explore the limitations of the graphing calculator as it relates to the behavior of the function around discontinuities</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(M) describe the left-sided behavior and the right-sided behavior of the graph of a function around discontinuities</p>	<p>(i) describe the left-sided behavior of the graph of a function around discontinuities</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(M) describe the left-sided behavior and the right-sided behavior of the graph of a function around discontinuities</p>	<p>(ii) describe the right-sided behavior of the graph of a function around discontinuities</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(N) analyze situations modeled by functions, including exponential, logarithmic, rational, polynomial, and power functions, to solve real-world problems</p>	<p>(i) analyze situations modeled by functions, including exponential functions, to solve real-world problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(N) analyze situations modeled by functions, including exponential, logarithmic, rational, polynomial, and power functions, to solve real-world problems</p>	<p>(ii) analyze situations modeled by functions, including logarithmic functions, to solve real-world problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(N) analyze situations modeled by functions, including exponential, logarithmic, rational, polynomial, and power functions, to solve real-world problems</p>	<p>(iii) analyze situations modeled by functions, including rational functions, to solve real-world problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(N) analyze situations modeled by functions, including exponential, logarithmic, rational, polynomial, and power functions, to solve real-world problems</p>	<p>(iv) analyze situations modeled by functions, including polynomial functions, to solve real-world problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(N) analyze situations modeled by functions, including exponential, logarithmic, rational, polynomial, and power functions, to solve real-world problems</p>	<p>(v) analyze situations modeled by functions, including power functions, to solve real-world problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(O) develop and use a sinusoidal function that models a situation in mathematical and real-world problems</p>	<p>(i) develop a sinusoidal function that models a situation in mathematical problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(O) develop and use a sinusoidal function that models a situation in mathematical and real-world problems</p>	<p>(ii) develop a sinusoidal function that models a situation in real-world problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(O) develop and use a sinusoidal function that models a situation in mathematical and real-world problems</p>	<p>(iii) use a sinusoidal function that models a situation in mathematical problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(O) develop and use a sinusoidal function that models a situation in mathematical and real-world problems</p>	<p>(iv) use a sinusoidal function that models a situation in real-world problems</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(P) determine the values of the trigonometric functions at the special angles and relate them in mathematical and real-world problems</p>	<p>(i) determine the values of the trigonometric functions at the special angles</p>
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(P) determine the values of the trigonometric functions at the special angles and relate them in mathematical and real-world problems</p>	<p>(ii) relate them in mathematical problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(2) Functions. The student uses process standards in mathematics to explore, describe, and analyze the attributes of functions. The student makes connections between multiple representations of functions and algebraically constructs new functions. The student analyzes and uses functions to model real-world problems. The student is expected to:</p>	<p>(P) determine the values of the trigonometric functions at the special angles and relate them in mathematical and real-world problems</p>	<p>(iii) relate them in real-world problems</p>
<p>(3) Relations and geometric reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:</p>	<p>(A) graph a set of parametric equations</p>	<p>(i) graph a set of parametric equations</p>
<p>(3) Relations and geometric reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:</p>	<p>(B) convert parametric equations into rectangular relations and convert rectangular relations into parametric equations</p>	<p>(i) convert parametric equations into rectangular relations</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(3) Relations and geometric reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:</p>	<p>(B) convert parametric equations into rectangular relations and convert rectangular relations into parametric equations</p>	<p>(ii) convert rectangular relations into parametric equations</p>
<p>(3) Relations and geometric reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:</p>	<p>(C) use parametric equations to model and solve mathematical and real-world problems</p>	<p>(i) use parametric equations to model mathematical problems</p>
<p>(3) Relations and geometric reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:</p>	<p>(C) use parametric equations to model and solve mathematical and real-world problems</p>	<p>(ii) use parametric equations to model real-world problems</p>
<p>(3) Relations and geometric reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:</p>	<p>(C) use parametric equations to model and solve mathematical and real-world problems</p>	<p>(iii) use parametric equations to solve mathematical problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(3) Relations and geometric reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:</p>	<p>(C) use parametric equations to model and solve mathematical and real-world problems</p>	<p>(iv) use parametric equations to solve real-world problems</p>
<p>(3) Relations and geometric reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:</p>	<p>(D) graph points in the polar coordinate system and convert between rectangular coordinates and polar coordinates</p>	<p>(i) graph points in the polar coordinate system</p>
<p>(3) Relations and geometric reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:</p>	<p>(D) graph points in the polar coordinate system and convert between rectangular coordinates and polar coordinates</p>	<p>(ii) convert between rectangular coordinates and polar coordinates</p>
<p>(3) Relations and geometric reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:</p>	<p>(E) graph polar equations by plotting points and using technology</p>	<p>(i) graph polar equations by plotting points</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(3) Relations and geometric reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:</p>	<p>(E) graph polar equations by plotting points and using technology</p>	<p>(ii) graph polar equations by using technology</p>
<p>(3) Relations and geometric reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:</p>	<p>(F) determine the conic section formed when a plane intersects a double-napped cone</p>	<p>(i) determine the conic section formed when a plane intersects a double-napped cone</p>
<p>(3) Relations and geometric reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:</p>	<p>(G) make connections between the locus definition of conic sections and their equations in rectangular coordinates</p>	<p>(i) make connections between the locus definition of conic sections and their equations in rectangular coordinates</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(3) Relations and geometric reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:</p>	<p>(H) use the characteristics of an ellipse to write the equation of an ellipse with center (h, k)</p>	<p>(i) use the characteristics of an ellipse to write the equation of an ellipse with center (h, k)</p>
<p>(3) Relations and geometric reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:</p>	<p>(H) use the characteristics of an ellipse to write the equation of an ellipse with center (h, k)</p>	<p>(ii) use the characteristics of a hyperbola to write the equation of a hyperbola with center (h, k)</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(A) determine the relationship between the unit circle and the definition of a periodic function to evaluate trigonometric functions in mathematical and real-world problems</p>	<p>(i) determine the relationship between the unit circle and the definition of a periodic function to evaluate trigonometric functions in mathematical problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(A) determine the relationship between the unit circle and the definition of a periodic function to evaluate trigonometric functions in mathematical and real-world problems</p>	<p>(ii) determine the relationship between the unit circle and the definition of a periodic function to evaluate trigonometric functions in real-world problems</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(B) describe the relationship between degree and radian measure on the unit circle</p>	<p>(i) describe the relationship between degree and radian measure on the unit circle</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(C) represent angles in radians or degrees based on the concept of rotation and find the measure of reference angles and angles in standard position</p>	<p>(i) represent angles in radians or degrees based on the concept of rotation</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(C) represent angles in radians or degrees based on the concept of rotation and find the measure of reference angles and angles in standard position</p>	<p>(ii) find the measure of reference angles</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(C) represent angles in radians or degrees based on the concept of rotation and find the measure of reference angles and angles in standard position</p>	<p>(iii) find the measure of angles in standard position</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(D) represent angles in radians or degrees based on the concept of rotation in mathematical and real-world problems, including linear and angular velocity</p>	<p>(i) represent angles in radians or degrees based on the concept of rotation in mathematical problems, including linear velocity</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(D) represent angles in radians or degrees based on the concept of rotation in mathematical and real-world problems, including linear and angular velocity</p>	<p>(ii) represent angles in radians or degrees based on the concept of rotation in real-world problems, including linear velocity</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(D) represent angles in radians or degrees based on the concept of rotation in mathematical and real-world problems, including linear and angular velocity</p>	<p>(iii) represent angles in radians or degrees based on the concept of rotation in mathematical problems, including angular velocity</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(D) represent angles in radians or degrees based on the concept of rotation in mathematical and real-world problems, including linear and angular velocity</p>	<p>(iv) represent angles in radians or degrees based on the concept of rotation in real-world problems, including angular velocity</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(E) determine the value of trigonometric ratios of angles and solve problems involving trigonometric ratios in mathematical and real-world problems</p>	<p>(i) determine the value of trigonometric ratios of angles</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(E) determine the value of trigonometric ratios of angles and solve problems involving trigonometric ratios in mathematical and real-world problems</p>	<p>(ii) solve problems involving trigonometric ratios in mathematical problems</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(E) determine the value of trigonometric ratios of angles and solve problems involving trigonometric ratios in mathematical and real-world problems</p>	<p>(iii) solve problems involving trigonometric ratios in real-world problems</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(F) use trigonometry in mathematical and real-world problems, including directional bearing</p>	<p>(i) use trigonometry in mathematical, including directional bearing</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(F) use trigonometry in mathematical and real-world problems, including directional bearing</p>	<p>(ii) use trigonometry in real-world problems, including directional bearing</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(G) use the Law of Sines in mathematical and real-world problems</p>	<p>(i) use the Law of Sines in mathematical problems</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(G) use the Law of Sines in mathematical and real-world problems</p>	<p>(ii) use the Law of Sines in real-world problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(H) use the Law of Cosines in mathematical and real-world problems</p>	<p>(i) use the Law of Cosines in mathematical problems</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(H) use the Law of Cosines in mathematical and real-world problems</p>	<p>(ii) use the Law of Cosines in real-world problems</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(I) use vectors to model situations involving magnitude and direction</p>	<p>(i) use vectors to model situations involving magnitude and direction</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(J) represent the addition of vectors and the multiplication of a vector by a scalar geometrically and symbolically</p>	<p>(i) represent the addition of vectors geometrically</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(J) represent the addition of vectors and the multiplication of a vector by a scalar geometrically and symbolically</p>	<p>(ii) represent the addition of vectors symbolically</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(J) represent the addition of vectors and the multiplication of a vector by a scalar geometrically and symbolically</p>	<p>(iii) represent the multiplication of a vector by a scalar geometrically</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(J) represent the addition of vectors and the multiplication of a vector by a scalar geometrically and symbolically</p>	<p>(iv) represent the multiplication of a vector by a scalar symbolically</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(K) apply vector addition and multiplication of a vector by a scalar in mathematical and real-world problems</p>	<p>(i) apply vector addition in mathematical problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(K) apply vector addition and multiplication of a vector by a scalar in mathematical and real-world problems</p>	<p>(ii) apply vector addition in real-world problems</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(K) apply vector addition and multiplication of a vector by a scalar in mathematical and real-world problems</p>	<p>(iii) apply multiplication of a vector by a scalar in mathematical problems</p>
<p>(4) Number and measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:</p>	<p>(K) apply vector addition and multiplication of a vector by a scalar in mathematical and real-world problems</p>	<p>(iv) apply multiplication of a vector by a scalar in real-world problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(A) evaluate finite sums and geometric series, when possible, written in sigma notation</p>	<p>(i) evaluate finite sums written in sigma notation</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(A) evaluate finite sums and geometric series, when possible, written in sigma notation</p>	<p>(ii) evaluate geometric series, when possible, written in sigma notation</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(B) represent arithmetic sequences and geometric sequences using recursive formulas</p>	<p>(i) represent arithmetic sequences using recursive formulas</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(B) represent arithmetic sequences and geometric sequences using recursive formulas</p>	<p>(ii) represent geometric sequences using recursive formulas</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(C) calculate the n^{th} term and the n^{th} partial sum of an arithmetic series in mathematical and real-world problems</p>	<p>(i) calculate the n^{th} term of an arithmetic series in mathematical problems</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(C) calculate the n^{th} term and the n^{th} partial sum of an arithmetic series in mathematical and real-world problems</p>	<p>(ii) calculate the n^{th} term of an arithmetic series in real-world problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(C) calculate the n^{th} term and the n^{th} partial sum of an arithmetic series in mathematical and real-world problems</p>	<p>(iii) calculate the n^{th} partial sum of an arithmetic series in mathematical problems</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(C) calculate the n^{th} term and the n^{th} partial sum of an arithmetic series in mathematical and real-world problems</p>	<p>(iv) calculate the n^{th} partial sum of an arithmetic series in real-world problems</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(D) represent arithmetic series and geometric series using sigma notation</p>	<p>(i) represent arithmetic series using sigma notation</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(D) represent arithmetic series and geometric series using sigma notation</p>	<p>(ii) represent geometric series using sigma notation</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(E) calculate the n^{th} term of a geometric series, the n^{th} partial sum of a geometric series, and sum of an infinite geometric series when it exists</p>	<p>(i) calculate the n^{th} term of a geometric series</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(E) calculate the n^{th} term of a geometric series, the n^{th} partial sum of a geometric series, and sum of an infinite geometric series when it exists</p>	<p>(ii) calculate the n^{th} partial sum of a geometric series</p>

Knowledge and Skills Statement	Student Expectation	Breakout
(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:	(E) calculate the n^{th} term of a geometric series, the n^{th} partial sum of a geometric series, and sum of an infinite geometric series when it exists	(iii) calculate the sum of an infinite geometric series when it exists
(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:	(F) apply the Binomial Theorem for the expansion of $(a + b)^n$ in powers of a and b for a positive integer n , where a and b are any numbers	(i) apply the Binomial Theorem for the expansion of $(a + b)^n$ in powers of a and b for a positive integer n , where a and b are any numbers
(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:	(G) use the properties of logarithms to evaluate or transform logarithmic expressions	(i) use the properties of logarithms to evaluate or transform logarithmic expressions

Knowledge and Skills Statement	Student Expectation	Breakout
(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:	(H) generate and solve logarithmic equations in mathematical and real-world problems	(i) generate logarithmic equations in mathematical problems
(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:	(H) generate and solve logarithmic equations in mathematical and real-world problems	(ii) generate logarithmic equations in real-world problems
(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:	(H) generate and solve logarithmic equations in mathematical and real-world problems	(iii) solve logarithmic equations in mathematical problems

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(H) generate and solve logarithmic equations in mathematical and real-world problems</p>	<p>(iv) solve logarithmic equations in real-world problems</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(I) generate and solve exponential equations in mathematical and real-world problems</p>	<p>(i) generate exponential equations in mathematical problems</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(I) generate and solve exponential equations in mathematical and real-world problems</p>	<p>(ii) generate exponential equations in real-world problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(I) generate and solve exponential equations in mathematical and real-world problems</p>	<p>(iii) solve exponential equations in mathematical problems</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(I) generate and solve exponential equations in mathematical and real-world problems</p>	<p>(iv) solve exponential equations in real-world problems</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(J) solve polynomial equations with real coefficients by applying a variety of techniques in mathematical and real-world problems</p>	<p>(i) solve polynomial equations with real coefficients by applying a variety of techniques in mathematical problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(J) solve polynomial equations with real coefficients by applying a variety of techniques in mathematical and real-world problems</p>	<p>(ii) solve polynomial equations with real coefficients by applying a variety of techniques in real-world problems</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(K) solve polynomial inequalities with real coefficients by applying a variety of techniques and write the solution set of the polynomial inequality in interval notation in mathematical and real-world problems</p>	<p>(i) solve polynomial inequalities with real coefficients by applying a variety of techniques in mathematical and real-world problems</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(K) solve polynomial inequalities with real coefficients by applying a variety of techniques and write the solution set of the polynomial inequality in interval notation in mathematical and real-world problems</p>	<p>(ii) write the solution set of the polynomial inequality in interval notation in mathematical problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(K) solve polynomial inequalities with real coefficients by applying a variety of techniques and write the solution set of the polynomial inequality in interval notation in mathematical and real-world problems</p>	<p>(iii) write the solution set of the polynomial inequality in interval notation in real-world problems</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(L) solve rational inequalities with real coefficients by applying a variety of techniques and write the solution set of the rational inequality in interval notation in mathematical and real-world problems</p>	<p>(i) solve rational inequalities with real coefficients by applying a variety of techniques</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(L) solve rational inequalities with real coefficients by applying a variety of techniques and write the solution set of the rational inequality in interval notation in mathematical and real-world problems</p>	<p>(ii) write the solution set of the rational inequality in interval notation in mathematical problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(L) solve rational inequalities with real coefficients by applying a variety of techniques and write the solution set of the rational inequality in interval notation in mathematical and real-world problems</p>	<p>(iii) write the solution set of the rational inequality in interval notation in real-world problems</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(M) use trigonometric identities such as reciprocal, quotient, Pythagorean, cofunctions, even/odd, and sum and difference identities for cosine and sine to simplify trigonometric expressions</p>	<p>(i) use trigonometric identities for cosine to simplify trigonometric expressions</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(M) use trigonometric identities such as reciprocal, quotient, Pythagorean, cofunctions, even/odd, and sum and difference identities for cosine and sine to simplify trigonometric expressions</p>	<p>(ii) use trigonometric identities for sine to simplify trigonometric expressions</p>

Knowledge and Skills Statement	Student Expectation	Breakout
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(N) generate and solve trigonometric equations in mathematical and real-world problems</p>	<p>(i) generate trigonometric equations in mathematical problems</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(N) generate and solve trigonometric equations in mathematical and real-world problems</p>	<p>(ii) generate trigonometric equations in real-world problems</p>
<p>(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:</p>	<p>(N) generate and solve trigonometric equations in mathematical and real-world problems</p>	<p>(iii) solve trigonometric equations in mathematical problems</p>

Knowledge and Skills Statement	Student Expectation	Breakout
(5) Algebraic reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:	(N) generate and solve trigonometric equations in mathematical and real-world problems	(iv) solve trigonometric equations in real-world problems