Department: Mathematics

Unit Title	Unit	Dates of Unit	Essential Questions	Topics to be Covered	Skills to be Assessed	Standard Alignment	Formative Assessments	Summative Assessments
Rational Functions	3	August - September	•What are the steps for finding asymptotes of a rational function? •What does the graph of a rational function look like? •What are the steps for graphing a rational function? •How can you know if a slant asymptote exists? •What aspects of a rational function determine the domain, range and zeros of that function?	Chapter 2.6&2.7 - Precalculus with Limits (A graphing approach) Larson 5th edition 2008	• How to find zeros of a polynomial function through factoring. • How to find the slant asymptote using polynomial long division or synthetic division. • How to find and graph horizontal and vertical asymptotes of rational functions. • How to determine the domain, range, and zeros of rational functions. • How to use rational functions to solve real world problems. • How to graph slant asymptotes if they exist, for rational functions. • What a rational function looks like graphically and algebraically.	A-APR-3 Understand the relationship between zeros and factors of polynomials. Factor and identify zeros. A-APR6 – Rewrite rational expressions using factoring and long division. A-REI -1- Understand solving equations as a process of reasoning and explain the reasoning. F-IF 7d – Graph rational functions; identify zeros and asymptotes when suitable factorizations are available, and show end behavior.	Prerequisite Skills assessment for chapter 2. Homework (nightly) from each section of the chapter, including vocabulary, exercises and word problems. Classwork/Group work – students practice the skills with peers and ask questions to improve understanding. Quizzes on Sections 2.6 and 2.7 Quick Quizzes – every 2-3 days on each section in the chapter – gives immediate feedback to the student & teacher. Remediate accordingly. Chapter assessment on Rational Functions.	Chapter Test
Exponential and Logarithmic Functions	5	October - November	• What does the graph of an exponential growth and decay function look like? • What is the relationship between exponential and logarithmic functions? • How can you use a calculator to evaluate a logarithm when the base is not 10 or e? • Why do logarithmic equations sometimes have extraneous solutions? • How do you determine whether a set of data fits and exponential pattern or a power pattern?	Chapter 3 - Precalculus with Limits (A graphing approach) Larson 5th edition 2008	• How to graph exponential growth functions and solve the real-world problems. • How to graph exponential decay functions and solve real-world problems. • How to evaluate exponential and logarithmic functions. • How to apply properties of logarithms. • How to solve exponential and logarithmic equations algebraically. • How to solve exponential and log equations with a TI-84, graphically. • Recognize the five most common types of mathematics models involing exponential or logarithmic functions.	F-BF 3 Identify the effect on exponential and logarithmic graphs with transformations. F-BF 5 – Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. F-IF.C.7e Graph exponential and logarithmic functions, showing intercepts and end behavior. F-IF 8b Use the properties of exponents to interpret the expressions for exponential functions. Classify as growth or decay. F-LE.4 For exponential models, express as a logarithm the solution and evaluate logarithms using technology.	Prerequisite Skills assessment for chapter 3. Homework (nightly) from each section of the chapter, including vocabulary, exercises and word problems. Quizzes on Sections 3.2 – 3.4 Quick Quizzes – every few days on each section in the chapter – gives immediate feedback to the student & teacher. Remediate accordingly.	Chapter test. End of Unit Task – Linear and Exponential Models – A Modeling task

Trigonometric Functions	4-5	December - January	• Apply the six trigonometric functions to right triangle trigonometry. • Convert from radians to degrees. • Use special triangles and the unit circle to determine the values of sine, cosine and tangent. • Identify and construct all six trigonometric graphs. • Apply inverse trigonometric functions to solve for angles. • Solve real-life problems involving right triangles.	Chapter 4 - Precalculus with Limits (A graphing approach) Larson 5th edition 2008	• Identify key features which include intercepts, increasing/decreasing intervals, relative max and min, symmetries, periodicity, midline, and amplitude. • When should the unit circle verses special triangles be applyied to solve problems? • What is the process to convert between degree and radian measure? Why? • What types of problems can be modeled with periodic phenomena? • Graph sine, cosine and tangent functions and translations. Locate key points (intercepts, minimums and maximums), mark these points on the graph, and then sketch the graph. Use technology to verify the graph.	A-CED 2 Create equations in two or more variable to represent relationships between quantities; graph equations on coordinate axes with labels and scales. F-IF 4 – Interpret key features of graphs and tables, sketch graphs with key features (intervals where the function is increasing, decreasing, positive, negative, relative maximums and minimums, end behavior and symmetry. F-IF 7e – Graph trigonometric functions, showing period, intercepts, midline and amplitude. F-BF 3 – Build new functions from existing functions, identify the effect of transformations from the parent graph. F-TF 1 –understand radian measure of an angle as the length of the arc on the unit circle. F-TF 3 – use special triangles to determine geometrically the values of sine, cosine and tangent. F-TF 6 – understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed. F-TF 7 – use inverse functions to solve trigonometric equations	Prerequisite Skills assessment for chapter 4. Homework (nightly) from each section of the chapter, including vocabulary, exercises and word problems. Quizzes on Sections 4.1-4.2; 4.3; 4.5-4.6; 4.7-4.8.	Chapter test
Analytic Trigonometry	3	February - March	• Which trigonometric identities are needed to solve this problem? • What are the strategies for simplifying or verifying trigonometric expressions? • What are the strategies for solving trigonometric equations algebraically and graphically? • How do you solve trigonometric equations written in quadratic form or containing more than one angle? • How do you identify all the values in the given interval? Identify the quadrants then the angles.	Chapter 5 - Precalculus with Limits (A graphing approach) Larson 5th edition 2008	• How to rewrite trigonometric expressions in order to simplify and evaluate trigonometric functions and to verify the trigonometric identities. • What are the different strategies to solve trigonometric identities? • Use algebraic techniques such as factoring, squaring a binomial, adding fractions or creating a monomial denominator to verify or solve identities or equations. • Students use the unit circle, special triangles and graphs of trigonometric functions to find values for angles. • Use inverse functions to solve trigonometric equations.	F-BF 3 – Build new functions from existing functions, identify the effect of transformations from the parent graph. F-TF 3 – use special triangles to determine geometrically the values of sine, cosine and tangent. F-TF 7 – use inverse functions to solve trigonometric equations F-TF 8 – Prove the Pythagorean identity and use it to find values of sine, cosine and tangent.	Prerequisite Skills assessment for chapter 5. Homework (nightly) from each section of the chapter, including vocabulary, exercises and word problems. Quizzes on Sections 5.1-5.3. Unit test on all 3 sections.	Chapter test

Additional Topics in Trigonometry	3	April - May	• When should the Law of Sines be used and on what triangles should the Law of Cosines be used? • What is the ambiguous case and how do the scenarios affect the solution to the problem? • How do you calculate the area of an oblique triangle? • Why are their two versions of the Law of Cosine formulas and when do you use each? • What formula should be used to solve a triangle when you are given SSS or SAS?	Chapter 6 - Precalculus with Limits (A graphing approach) Larson 5th edition 2008	• How to find side lengths, angles and areas of oblique triangles by applying the Law of Sines and Cosines. • How to use trigonometry to solve real world problems • Use the Law of Sines to find unknown angles and side lengths in the cases AAS, ASA, and SSA. • Use the Law of Cosines to find unknown angles or side lengths in the cases of SSS or SAS. • Recognize situations in which the ambiguous case SSA produces no solution, one solution or two solutions. • Find the area of a triangle by multiplying one-half the product of the lengths of two sides by the sine of their included angle.	G-SRT 10 Prove the Law of Sines and Cosines and use them to solve problems. G-SRT 11 Understand and apply the Law of Sines and Cosines to find unknown measurements in right and non-right triangles. G-SRT 9 Derive the formula A = .5absin(c) for the area of a triangle	Prerequisite Skills assessment for chapter 6. Homework (nightly) from each section of the chapter, including vocabulary, exercises and word problems. Quizzes on Sections 6.1 and 6.2	Chapter test

Sequences, Series and Probability	3	May - June	• How do you find the expansion of a binomial (x+y)n? • How do you use Pascal's triangle to find the coefficients? • List the possible ways each event can occur • What differentiates a permutation from a combination? • What is a distinguishable permutation? • What is an independent event? Cite an example? • What does equally likely mean and how does it affect the result in a probability problem? How do you find the probability that a series of events will occur?	Chapter 8: Sequences, Series and Probability (8.5, 8.6, & 8.7) & Supplements - Precalculus with Limits (A graphing approach) Larson 5th edition 2008	Know and apply the Binomial Theorem for the expansion of (x+y)^n in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's triangle. (ch8.5) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(A|B), and interpret the answer in terms of the model. (Supplement) Use permutations and combinations to compute probabilities of compound events and solve problems. (Ch8.6) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions. (Supplement) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution. (Supplement) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple choice test where each question has four choices, and find the expected grade under various grading schemes. (Supplement) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the USA, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households? (Supplement) Use probabilities to make fair decisions (e.g. drawing by lots, using a random number generator). (8.7 & supplement) Analyze decisions and strategies using probability concepts (e.g. product testing, medical testing, pulling a hockey goalie at the end of a game). (Supplement) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or a game at a fast food restaurant. (Supplement) Evaluate and compare strategies on the basis of expected values. For example, compare a high-deductible verses a low deductible automobile insurance policy using various, but reasonable chances of having a minor or a major accident. (Supplement)	A-APR-5 S-CP-7-9 S-MD-1-7	Prerequisite Skills assessment for chapter 8. Homework (nightly) from each section of the chapter, including vocabulary, exercises and word problems. Quizzes on each section 8.5, 8.6 and 8.7.	Chapter test