

Math 150 Functions, Trigonometry, and Linear Systems**Instructor:** Dr. Sherry Scarborough**Office:** 629B Blocker**Email Address:** sherry.scarborough@math.tamu.edu**Emails:** In all correspondence, please include your *name*, your *course number*, and your *section number* in the subject line. Please regularly check your TAMU email, as I often send the class emails.**Web Site:** <http://www.math.tamu.edu/~Sherry.Scarborough/>**Dr. Sherry's Office Hours:** Mondays 3 – 4pm, Tuesdays 1:30–3:15pm, Thursdays 1:30–3:15pm**Textbook:** Online Textbook: *PreCalculus* (WebAlg) - 1e by David Manuel, Michael Stecher, and Patti Wells, which will be accessed via WebAssign, your online homework system.**Calculator:** No calculators are allowed on quizzes or exams. In-class calculator demonstrations will be done with a TI-83/84. It is recommended that you do as much of your online homework without the use of a calculator as you can. For the online homework problems that do require a calculator, a TI-83/84 or TI-83/84 Plus calculator is recommended.**Course Description:** Math 150: Functions, Trigonometry, and Linear Systems (Credit 4). Graphs, functions, college algebra and trigonometry, linear systems and vectors.**Class Times**

- Sections 501-506: MWF 10:20 – 11:10am BLOC 169
- Sections 507-512: MWF 11:30am – 12:20pm ILSB 1105

Recitation: Attendance in your recitation section is required, and you must attend the recitation section in which you are enrolled. Recitation sessions are led by a teaching assistant (TA) and meet once a week, every week, including the first week, either on Tuesday or Thursday depending upon your section number. You will be meeting in small sections to ask questions of the TA about the material covered in class and homework problems, and you will be doing group worksheets and taking individual quizzes and individual exams. You will be assigned to a group during week two's recitation.**Tentative Exam Schedule***ODD SECTION NUMBERS*Exam I September 20th and 21stExam II October 18th and 19thExam III November 15th and 16th*EVEN SECTION NUMBERS*Exam I September 21st and 22ndExam II October 19th and 20thExam III November 16th and 17th**Comprehensive Final Exam Schedule**

- Sections 501-506: Friday December 9 from 3 – 5 pm BLOC 169
- Sections 507-512: Monday December 12 from 10:30am – 12:30pm ILSB 1105

Grading: The average of your 3 regular exams (15% each) will count as 45% of your grade, your assignment/quiz average 15%, your online homework 15%, and your comprehensive final 25%. Due to confidentiality, grades will not be discussed via phone or email, only in person.

Grade cutoffs: A is 90 – 100%, B is 80 – 89%, C is 70 – 79%, D is 60 – 69%, and F is 0 to 59%.

Exams: You will need to bring to your exams your Texas A&M student ID, a #2 pencil and an eraser. You will also need Scantron form 882E for your recitation exams and for your comprehensive final exam. For your 3 regular exams, you will be taking part of your exam in recitation and part of your exam in lecture. The regular exam in lecture will be work-out. The exam in recitation will be multiple-choice and. The comprehensive final exam will be multiple choice and taken in the lecture room. No calculators, cameras or recording devices allowed.

Assignments/Quizzes: Quizzes may be given in lecture or in recitation, and may or may not be announced ahead of time. Assignments and quizzes may be in class or out of class. Some assignments (group worksheets) will be done in assigned groups. Your note-card quiz assignment, which is due on or before your recitation the third week of school (September 13th or 15th), is found at the following web site: <http://www.math.tamu.edu/~scarboro/150fall2011welcome.pdf>. At the *end* of the semester, 2 of your lowest assignment/quiz scores, except your note-card grade, will be dropped before the assignment/quiz average is calculated. No calculators allowed on quizzes whether they are group worksheets or individual quizzes.

WebAssign: All online homework will be based in the online system WebAssign.

- Everything you will need to know about creating an account and logging in is available here: <http://www.math.tamu.edu/courses/eHomework/>. Notice the important links across the top: *WebAssign Login Page*, *Student Help Request Form* (this is where you go if you are having any trouble with WebAssign), *Student Information Page* and *FAQ*. Now go to the *Student Information Page* and read the **Math 150** link and ALL the links under **Student Help Links**.
- A WebAssign account has an access fee of \$48.95 and you will need to “purchase access online” *during* the first two weeks of school. After that, you risk being locked out of the system and missing important assignments.
- At the *end* of the semester, 2 of your lowest online homework grades will be dropped.

Grade Disputes: Once you leave class with any graded paper you accept its grade, unless there is a totaling error. All grade disputes must be dealt with at the time you receive them. If the grade was not totaled correctly, you have one week from when the paper was first returned to the class to get the correction made.

Student ID: You will need to have your Texas A&M student ID with you for ALL classes.

Help Sessions: Help Sessions are a place to see homework-type problems worked and a place to get online homework help. Help Sessions usually start about the second week of school. There is a Help Session link on my Math 150 web page.

Week-In-Reviews (WIR): Weekly reviews will be given by Math 150 instructor Dr. Sherry Scarborough. These include an exam review on the week of your exam. WIR is not held the week immediately after an exam week. On my Math 150 web page are links to Week-In-Reviews for this semester as well as in the past. The WIR starts the second week of school. See <http://www.math.tamu.edu/~scarboro/150fall2011wir.html> for this semester's WIR.

Policies: Policies pertaining to absences, scholastic dishonesty and final examinations are identical to TAMU regulations. Students with an official excused absence are permitted to make up work only for the dates of the absence. All other assigned work, even that assigned on the excused date, is due as assigned.

Make-Up Policy: No make-up examinations or assignments will be given without a university approved excused absence (See the [Texas A&M University Student Rules](#).) An absence for a non-acute medical service or regular check-up does not constitute an excused absence. To be excused you must notify Dr. Sherry by email prior to date of absence if such notification is feasible. Consistent with Texas A&M Student Rules, students are required to notify their instructor (Dr. Sherry) by the end of the second school day after missing an examination or assignment. For injury or illness too severe or contagious to attend class, you must provide confirmation of a visit to a health care professional affirming date and time of visit. The Texas A&M University Explanatory Statement for Absence from Class Form will NOT be accepted. *It is the student's responsibility to schedule a makeup!* Attendance is required in this course.

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Late Policy: No late work will be accepted.

Plagiarism: All printed handouts and web materials are protected by U.S. Copyright Laws. Handouts are all materials generated for this course, which include but are not limited to syllabi, assignments, quizzes, examinations, in-class materials, online homework, and anything downloaded from a web page. Because these materials are copyrighted, **you do not have the right to copy the handouts**, unless I expressly grant permission. As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated.

Academic Integrity Statement: Aggie Honor Code: “An Aggie does not lie, cheat, or steal or tolerate those who do.” Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. For additional information please visit <http://www.tamu.edu/aggiehonor/>. Students may work together on their homework from the *text*, unless otherwise directed. Examinations, online homework, and quizzes are to be taken individually.

Disabilities: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit <http://disability.tamu.edu> .

Personal Requests: You are always welcome to come to my office hours; you do not need an appointment. I encourage you to come, ask questions, as often as you would like. Students who come to office hours can get personal attention and help. If you smoke, please ‘air out’ before visiting. As a courtesy to all, please turn your cell phones and pagers off during all classes and office hours. Thanks!

Please Note: While it is critical that you attain the correct answer to a question, you must show correctly, precisely, and accurately its solution (all the steps, labels, explanations, equal signs, models, etc.) in an orderly, clear, concise manner. Where appropriate, circle your final answer. You are responsible for your own learning.

Emergencies: On-campus phones: 9-911

Off-campus and cell phones: 911

Tentative Schedule

Week 1: Introduction, Sections 1A – 1C: real numbers, exponents, radicals, polynomials

Week 2: Sections 1C – 2A: polynomials, rational expressions, complex numbers, solving equations

Week 3: Sections 2A – 2B: solving equations, solving inequalities

Week 4: Review, **EXAM 1 (1A – 2B)**, Sections: 3A rectangular coordinate system

Week 5: Sections 3A – 4A: graphs of equations, linear equations and inequalities in two variables, functions

Week 6: Sections 4B – 4E: graphs of functions, transformations of functions, extreme function values, combinations of functions

Week 7: Sections 4E – 5A: combinations of functions, inverse functions, polynomial functions

Week 8: Review, **EXAM 2 (3A – 5A)**, Sections 5B: rational functions

Week 9: Sections 5B – 5D: rational functions, exponential functions, logarithmic functions

Week 10: Sections 5D – 7B: logarithmic functions, exponential and logarithmic equations, applications of exponentials and logarithms, systems of linear and non-linear equations

Week 11: Sections 8A – 8D: angles and circles, trigonometric functions and their graphs, trigonometric identities

Week 12: Review, **EXAM 3 (5B – 8D)**, Sections: 8E – 8F inverse sine functions, inverse trigonometric functions

Week 13: Sections 8G – 8H: law of sines and cosines, solving trigonometric equation

Week 14: Sections 8H – 9D: solving trigonometric equations, vectors, scalar multiplication, vector addition, vector length

Week 15: 9D – 9E: vector length, dot product; Review

Help:

- Bookmark my web page so you will know where to find all important information <http://www.math.tamu.edu/~Sherry.Scarborough/>
- Bookmark my Math 150 web page <http://www.math.tamu.edu/~sherry.scarborough/150topics.html>
- Read the first day handout and the welcome note found on my Math 150 web page
- Read my class notes (found on elearning.tamu.edu) and skim the online book before class
- Attend all classes, including all recitations
- Bring your class notes, calculator, pencil, and TAMU student ID to every class
- Do all your graded online homework
- Ask questions
- Do all your text homework
- Attend Dr. Sherry's office hours
- Attend help sessions <http://www.math.tamu.edu/teaching/wordpress/stuinfo/index.php>
- Attend Week-In-Review (WIR) and do the problems before going to WIR or looking at the solutions, <http://www.math.tamu.edu/~scarboro/150fall2011wir.html>
- Do past WIR problems <http://www.math.tamu.edu/~sherry.scarborough/150topics.html>
- Watch the special topic streaming videos found on my Math 150 web page
- Ask me for help with homework problems during office hours
- Read "Success at Math" at <http://www.math.tamu.edu/~jmlinhart/success.html>
- Keep up with the course
- Form study groups and get together regularly
- Get a personal tutor (a list is available outside Blocker 601)
- Contact the Learning Skills Center (845-4427)
- Contact tutoring@aggieculture.tamu.edu
- Contact Services for Students with Disabilities, if needed, at 845-1637
- Read *How is College Different from High School?* by TAMU Student Counseling Service at <http://www.math.tamu.edu/~scarboro/howiscollegedifferentfromhighschool.pdf>
- Read *Self Help-Math Study Skills* by TAMU Student Counseling Service at <http://scs.tamu.edu/?q=node/92>
- See TAMU Student Counseling Service *Self Help Guides* at <http://scs.tamu.edu/?q=node/88#academic>

Math 150 Learning Outcomes**A. Basic Algebraic Concepts**

1. Real Numbers
 - a. Identify and properly use the properties of real numbers
 - b. Distinguish the types of real numbers and their relationship to each other
 - c. Use the real number line
 - d. Know, interpret, and use the definition of absolute value
 - e. Find the distance between two real numbers
2. Exponents and Radicals
 - a. Know and apply the properties of exponents and radicals
 - b. Simplify radical expressions
 - c. Rationalize a denominator that contains a radical
 - d. Combine radical expressions
3. Polynomials
 - a. Know the definition of and identify a polynomial expression
 - b. Identify the leading coefficient, leading term, and constant term of a polynomial expression
 - c. Identify the degree of a polynomial and know the special types (binomial, quadratic, trinomial, cubic, quartic, etc.)
 - d. Add, subtract, multiply and divide polynomial expressions
 - e. Identify the dividend, divisor, quotient, remainder
 - f. Perform polynomial long division
 - g. Apply special products to multiply and to factor: difference of squares, square of a binomial, sum of cubes, difference of cubes, cube of a binomial
 - h. Factor polynomial expressions by factoring out common factors, by grouping, by using special products, and by other methods
4. Rational Expressions
 - a. Know the definition of and identify a rational expression
 - b. Simplify a rational expression, including compound fractions
 - c. Identify the domain and range of a rational expression
 - d. Add, subtract, multiply and divide rational expressions, including compound fractions
5. Complex Numbers
 - a. Identify a complex number, along with its real part and its imaginary part
 - b. Understand the imaginary unit
 - c. Understand the relationship between the real numbers and the complex numbers
 - d. Determine if two complex numbers are equal
 - e. Understand what it means for two complex numbers to be equal
 - f. Find the absolute value of a complex number
 - g. Apply the properties of complex numbers
 - h. Find the conjugate of a complex number
 - i. Apply the properties of a complex conjugate
 - j. Add, subtract, and multiply complex numbers

B. Equations and Inequalities

1. Solving Equations
 - a. Solve one-variable equations
 - b. Solve quadratic equations by factoring, by completing the square, and by the quadratic formula
 - c. Solve quadratic-like equations
 - d. Solve rational equations
 - e. Solve radical equations
 - f. Solve absolute-value equations
 - g. Solve equations in several variables for one of the variables

2. Solving Inequalities
 - a. Solve inequalities and give answers as an inequality, on a number line, and in interval notation
 - b. Solve linear inequalities
 - c. Solve absolute-value inequalities
 - d. Solve non-linear inequalities

C. Graphing

1. Rectangular (Cartesian) Coordinate Systems
 - a. Label axes, quadrants, and points in the plane
 - b. Shade the region of the plane that corresponds to a set of ordered pairs (inequality)
 - c. Understand a relation and its graph, domain, and range
 - d. Find the distance between two points in the plane
 - e. Apply the Pythagorean Theorem and its converse
 - f. Find the midpoint of a line segment that connects two points in the plane
 - g. Know and apply the definition of a circle, along with its center, radius, domain and range
 - h. Find the center and radius of a circle
 - i. Graph a circle
 - j. Find the equation of a circle based upon given information
2. Graphs of Equations
 - a. Graph by plotting points
 - b. Identify whether given points are on the graph of a given equation
 - c. Find particular solutions of an equation with infinite solutions
 - d. Graph equations
 - e. Identify the x -intercepts, y -intercepts, zeros, domain, and range of equations
 - f. Algebraically test an equation for symmetries about the x -axis, y -axis and origin
 - g. Recognize if a graph is symmetric about x -axis, y -axis, or origin
3. Linear Equations and Inequalities in Two Variables
 - a. Identify if an equation is linear
 - b. Graph an equation of a line
 - c. Identify the x -intercepts and y -intercepts
 - d. Understand the correlation between the steepness of the slope of a line and the numerical value of the line's slope
 - e. Understand the correlation between the slope of the line and whether the line increasing, decreasing, or constant
 - f. Calculate the slope of a line given two points, a parallel line, or a perpendicular line
 - g. Write the equation of a non-vertical line by using the slope-intercept form or point-slope form
 - h. Write the equation of a horizontal or vertical line

D. Functions

1. Introduction to Functions
 - a. Determine if a relation is a function
 - b. Determine if a relation is a function given a table of values
 - c. Understand and apply function notation
 - d. Evaluate a function for a given value of the independent variable
 - e. Estimate the value of a function at a point from a graph
 - f. Identify the domain, range, x -intercepts, and y -intercept of a function
 - g. Evaluate and simplify the difference quotient
 - h. Apply functions in an application setting
2. Graphs of Functions
 - a. Determine if a graph represents a function by using the Vertical Line Test
 - b. Graph a function
 - c. Use graphs to find the domain, range, x -intercepts, and y -intercept of functions
 - d. Recognize the graphs of a constant, identity, square, cube, square root, absolute value, and reciprocal function

- e. Graph piece-wise defined functions
- f. Evaluate a piece-wise function for a given value of the independent variable
- g. Find the domain and range of a piece-wise defined function
- h. Determine where a graph is increasing, decreasing or constant
3. Transformation of Functions
 - a. Apply vertical and horizontal shifts
 - b. Reflect a function about the x -axis or y -axis
 - c. Apply vertical stretches and shrinkages
 - d. Identify the change in the function rule given original and transformed graphs
 - e. Determine if a function is even, odd, or neither by its graph
 - f. Algebraically determine if a function is even, odd, or neither
4. Maximum and Minimum Functions Values
 - a. Identify a quadratic function in general and standard form and be able to convert between the two forms
 - b. Graph a quadratic function (parabola)
 - c. Put a quadratic function in standard form
 - d. Identify the vertex, direction of the opening, axis of symmetry, and zeros of a parabola
 - e. Apply the quadratic formula
 - f. Exactly find the maximum or minimum value of a quadratic function and where it occurs
 - g. Sketch a graph that satisfies certain characteristics
 - h. Calculate and interpret the discriminant of a quadratic function
 - i. Approximately find the local maximums and minimums of non-quadratic functions using a graphing calculator
 - j. Apply quadratic and cubic functions to extrema applications
5. Combinations of Functions
 - a. Add, subtract, multiply, and divide functions, and find the resultant domain
 - b. Apply function composition and find the resultant domain
 - c. Break a composed function into its two simpler functions
 - d. Graphically add, subtract, multiply and compose two functions
6. Inverse Functions
 - a. Find an inverse of a relation
 - b. Determine if the inverse relation is a function
 - c. Graph a relation and its inverse
 - d. Find the domain and range of a function and its inverse
 - e. Determine if a function is a one-to-one function graphically and by using the Horizontal Line Test
 - f. Algebraically prove or disprove if a function is one-to-one
 - g. Define an inverse function
 - h. Given a point of a function, find the corresponding point in its inverse
 - i. Determine if two functions are inverses
 - j. Find the inverse of a function
 - k. Restrict the domain of a non-one-to-one function such that the function with the restricted domain is a one-to-one function, and then find its inverse

E. Special Type of Functions

1. Polynomial Functions
 - a. Know the definition of and identify a polynomial function
 - b. Identify the leading coefficient, leading term, and constant term of a polynomial function
 - c. Describe the end behavior of polynomials
2. Rational Functions
 - a. Know the definition of and identify a rational function
 - b. Find the domain, range, x -intercepts, y -intercept, horizontal asymptote, holes, and vertical asymptotes of a rational function
 - c. Evaluate limits at infinity

- d. Evaluate limits at infinity for rational functions and consequently determine the horizontal asymptotes
 - e. Evaluate left- and right-handed limits
 - f. Evaluate left- and right-handed limits of a value for rational functions and consequently determine the vertical asymptotes
 - g. Know which kind of asymptotes can and which kind cannot cross the graph of a rational function
3. Exponential Functions
- a. Distinguish between graphs of exponential functions with different bases and coefficients
 - b. Simplify exponential expressions using properties of exponents
 - c. Apply the properties of exponential functions
 - d. Know which exponential functions are increasing and which are decreasing
 - e. Find the domain, range, graphs, limits at infinity, intercepts, and asymptotes of exponential functions
 - f. Identify the change in the function rule given original and transformed exponential graphs
 - g. Solve equations involving exponential functions
 - h. Understand that e is a transcendental number and be able to name other transcendental numbers
 - i. Approximate e raised to some real number power
4. Logarithmic Functions
- a. Know the definition of a logarithm
 - b. Convert between an exponential and logarithmic equations
 - c. Evaluate logarithms
 - d. Simplify logarithmic functions using properties of logarithms
 - e. Find the domain, range, graphs, intercepts, limits, and asymptotes of logarithmic functions
 - f. Identify the change in the function rule given original and transformed logarithmic graphs
 - g. Condense and expand logarithmic expressions
 - h. Solve equations involving logarithmic functions
 - i. Perform all of the above using the natural log
 - j. Know and apply the change of base formula
 - k. Given an exponential or logarithmic function, find its inverse function

F. Exponentials and Logarithms

1. Exponential and Logarithmic Equations
 - a. Solve exponential equations
 - b. Solve logarithmic equations
2. Applications of Exponentials and Logarithms
 - a. Model exponential growth and decay
 - b. Identify the initial amount or population in an exponential growth or decay problem
 - c. Convert an exponential expression to a natural exponential expression
 - d. Identify if a model is exponential growth, exponential decay, or neither
 - e. Given data points determine the appropriate exponential model
 - f. Apply exponential functions to applications
 - g. Find the half-life in an exponential decay application
 - h. Find the amount of material left after a given period of time in an exponential application

G. Systems of Equations

1. Systems of Linear Equations
 - a. Identify which points are a solution to a system of equations
 - b. Know the number of solutions to a system of equations in the plane
 - c. Find the solutions to a system of equations by graphing, by substitution, and by elimination
 - d. Apply system of equations to solve application problems
2. Systems of Non-Linear Equations
 - a. Solve non-linear systems of equations by graphing, by substitution, and by elimination
 - b. Apply systems of equations to solve application problems

H. Trigonometry

1. Angles and Circles
 - a. Identify and graph an angle in standard position and know its initial side
 - b. Identify and graph a positive angle and a negative angle
 - c. Convert angles among revolutions, degrees, and radians
 - d. Know an acute angle, an obtuse angle, the complement of an angle, and supplement of an angle
 - e. Know and identify a circle including its center and radius, diameter, disk, arc, chord, central angle, sector, secant line, tangent line, and point of tangency on a circle
 - f. Calculate the circumference of a circle
 - g. Calculate the area of a circle
 - h. Calculate an arc length
 - i. Calculate the area of a sector
2. Trigonometric Functions
 - a. Apply the Pythagorean Theorem
 - b. Apply the knowledge of the ratio of the sides of a 30-60-90 degree triangle
 - c. Apply the knowledge of the ratio of the sides of a 45-45-90 degree triangle
 - d. Know and apply the definition of the trig functions using triangles
 - e. Know and apply the definition of the trig functions using circles
 - f. Know the signs of the trig functions in each quadrant of the plane
 - g. Know and apply the trig functions to the special angles
 - h. Given the value of one of the trig functions of an angle and given information to find the quadrant the angle is in, evaluate the other trig functions of that angle
3. Graphs of Trigonometric Functions
 - a. Know the graphs, domain, range, asymptotes if applicable, amplitude if applicable, and period of the trig functions
 - b. Know which trig functions are even and which are odd
 - c. Given the equation of a trig function, find the amplitude if applicable, period, reflection, phase shift, and vertical shift as compared to one of the basic trig functions
 - d. Find a trig function based upon its graph
4. Trigonometric Identities
 - a. Know and apply the basic trig identities, Pythagorean identities, sum of two angle formulas and double angle formulas
 - b. Given an identity, be able to apply it
 - c. Prove trig identities
5. Inverse Sine Functions
 - a. Know and apply the inverse sine function
 - b. Know the domain and range of the inverse sine function
 - c. Graph the inverse sine function
 - d. Find the angle represented by the inverse sine of a number
 - e. Evaluate a trig function of an inverse sine
 - f. Evaluate an inverse sine of a trig function
6. Inverse Trigonometric Functions
 - a. Know and apply the inverse cosine and inverse tangent functions
 - b. Know the domain and range of the inverse cosine and inverse tangent functions
 - c. Graph the inverse cosine and inverse tangent functions
 - d. Find the angle represented by the inverse cosine or inverse tangent of a number
 - e. Evaluate a trig function of an inverse cosine or inverse tangent
 - f. Evaluate an inverse cosine or inverse tangent of a trig function
7. Law of Sines and Cosines
 - a. Know and apply the Law of Sines
 - b. Know and apply the Law of Cosines
 - c. Know which given angles and sides of a triangle constitute ambiguous cases
 - d. Solve the triangle by finding the missing sides and/or angles

8. Solving Trigonometric Equations
 - a. Solve trig equations on a given interval
 - b. Solve trig equations for all real numbers

I. Vectors

1. Definition of Vectors
 - a. Understand the definition of vector, and its magnitude and direction
 - b. Understand the definition of a unit vector
 - c. Graph vectors
 - d. Understand and apply the special unit vectors
 - e. Apply vectors to an application problem
 - f. Evaluate the resultant vector
 - g. Given a vector, find the angle that it makes with an axis
2. Scalar Multiplication
 - a. Perform scalar multiplication of vectors
 - b. Graph the resultant vector of scalar multiplication on a vector
3. Vector Addition
 - a. Add vectors
 - b. Apply the properties of algebraic vector operations
4. Length
 - a. Evaluate the length of a vector
 - b. Apply the properties of vector length, including the Triangle Inequality
 - c. Apply vectors and vector length to application problems
 - d. Find the velocity and speed of an application problem using vectors
 - e. Find the unit vector in the same direction as a given vector
 - f. Find the parallel vector to a given vector
5. Dot Product
 - a. Evaluate the dot product of vectors
 - b. Know and apply the Dot Product Theorem to find the angle between two vectors
 - c. Determine if two vectors are perpendicular or not
 - d. Apply the properties of dot product