The Honolulu Community College Foundations Board will review all proposals to ensure that approved courses meet Foundations Hallmarks. If clarification is needed, a Board member will contact you. If the Foundations Board and the General Education Committee approve the proposal, all sections of the course will be designated as satisfying the requirement. The course will be reviewed every five years.

1. **Course information.**
   - Course Alpha: MATH
   - Course Number: 135
   - If the course is cross listed, please provide the cross-listing:
     - Alpha Number

2. **Course Title:** Pre-Calculus, Elementary Functions

3. **Foundations area requested.** Check one.
   - Global & Multicultural Perspectives [X]
   - Symbolic Reasoning [X]
   - Written Communication [ ]

4. **How many instructors currently teach this course?** It makes a difference if there are only one or two instructors teaching this course versus ten instructors teaching this course. This question is asked to get an idea of how many instructors the department needs to communicate with to discuss this foundation course.

5. **Syllabus.** Submit a master syllabus. If multiple instructors teach the course and use varying texts and/or assignments, please include multiple representative syllabi for comparison. (Three is recommended.)

6. **Hallmark Requirements.** Provide an explanation of how each of the hallmarks for this proposed Foundation course will be satisfied. Try to completely answer how the course intends to meet each particular hallmark. Referencing assignments, tasks, and evaluations used in the course (as stated on the syllabus /syllabi being submitted) as supporting evidence would be very helpful.

7. **Assessment.** Provide a brief explanation of how the department will periodically review that this course has been meeting the Foundations Hallmarks including a description of what kinds of evidence will be collected to demonstrate this (Knowledge Survey results, sample of exam responses, writing samples, etc.). Also include a detailed description of how the department plans to have all instructors of this course share information with each other regarding how the hallmarks have been met. Please include a brief explanation of the assessment tools you will use to make this determination (such as Knowledge Surveys, Exams, Projects, Portfolios, etc.) and how you will use the results to make course improvements.

8. **Signatures.** The signatures of the initiator and the initiator’s Division Chair are required. The completed proposal must be routed to the Chair of the CPC before being delivered to the chair of the Foundations Board. No action on the part of the CPC is required unless the proposal also includes a new course Curriculum Action or a course modification Curriculum Action. The “routing” is a courtesy to the CPC. Signatures indicate approval/acceptance.

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Initiated by: Steven Mandraccia
   - Initiator’s signature
   - Initiator’s printed name
   - Date: 4/7/2016

Approved by: Michael Ferguson
   - Division Chair’s signature
   - Division Chair’s printed name
   - Date: 4/11/2016

Routed via: Kara Kam-Kalani
   - CPC Chair’s signature
   - CPC Chair’s printed name
   - Date: 4/15/2016

Accepted by: Steven Mandraccia
   - Foundation Board Chair’s signature
   - Foundation Board Chair’s printed name
   - Date: 4/18/2016
Official Course Description

MATH 135 Pre-Calculus: Elementary Functions

Course Description

Prerequisite: C or higher in Math 103 or placement in Math 135
This course is a study of elementary functions, including linear, quadratic, polynomial, rational, exponential, and logarithmic functions. Emphasis is placed on those topics that will prove useful to students who plan to take calculus.

This course fulfills the Symbolic Reasoning requirement for the Foundations requirement for Honolulu Community College and the University of Hawaii at Manoa. See the Manoa General Education requirements.

Symbolic Reasoning Objectives:

Students will
Demonstrate an understanding of the beauty, power, clarity, and precision of formal systems through guided practice in problem-solving elementary functions.
Demonstrate through performances on assessment exams, class work, and homework exercises the concept of proof as a chain of inferences.
Apply formal rules of algorithms to elementary functions.
Demonstrate correct and effective use of the symbolic rules of elementary functions on assessment exams, homework exercises, or related projects.
Analyze rules and theorems to find the most effective solutions to problems.
Apply principles of elementary functions to solve real-world problems.

Course Specific Learning Objectives

Students will
- Solve linear, quadratic and rational inequalities
- Use interval notation
- Solve absolute value equations and inequalities
- Find domains and ranges of functions, including sums of functions and composite functions
- Recognize odd and even functions (symmetry)
- Define continuous and discontinuous functions
- Transform functions, including vertical and horizontal translations
- Use function notation
- Perform operations on functions, including addition, subtraction, multiplication, division, and composition of functions
- Define and graph inverse functions
- Graph piecewise-defined functions
• Find all complex zeros of polynomial functions
• Graph general polynomial functions
• Graph rational functions including horizontal, vertical, slant and curvilinear asymptotes
• Graph radical functions
• Graph exponential and logarithmic functions
• Use the properties of logarithms
• Solve exponential and logarithmic equations
• Solve applied problems of exponential and logarithmic functions

In general, the course will prepare students for the study of calculus by providing them with skills, knowledge, and mathematical maturity necessary for success in that course. It will also prepare students for vocations in which knowledge of elementary functions is useful. Completion of this course with a “C” grade or higher satisfies the three credits of quantitative reasoning requirement of many University of Hawaii programs.

**Foundations Hallmarks – Symbolic Reasoning**

*Students will be exposed to the beauty, power clarity, and precision of formal systems.*

*How will the course meet this hallmark?*

The course is about elementary functions, studied from two different, yet complementary points of view. 1) Students apply formal algebraic techniques which allow precise calculation of function behavior regarding intercepts, asymptotes, intersection points, and occasionally turning points. 2) Students apply general rules regarding the overall shape of a function’s graph. The result of a precise algebraic calculation must agree with the overall shape.

Example 1: Students will be given a function like \( f(x) = (x+1)^4 \). They will be expected to realize that \( f(x) \) is a transformation of the basic power function \( g(x) = x^4 \). By applying general principles of transformations, the students will show the graph is U-shaped, opening downward, with a turning point at \((-1, 4)\) and a line of symmetry at \( x = -1 \). Students will be expected to realize there are two \( x \)-intercepts which are equidistant from \( x = -1 \). Students will be expected to find the \( y \)-intercept, \((0, 3)\), and know that by symmetry, a point exists on the other side of \( x = -1 \), the point \((-2, 3)\), and to determine the exact, and approximate, positions of the \( x \)-intercepts; \((-1.414, 0)\) and \((-0.414, 0)\). Finally, the students will sketch the graph and see that the graph agrees with the general positions implied by the transformations.

Example 3: Students will be given a function like \( R(x) = \frac{x^2 + x - 12}{x - 4} \) and be expected to determine apply general principles of asymptotes to find the graph has a vertical asymptote at \( x = 4 \), and an oblique, or slant, asymptote at \( y = x + 5 \). Students will use algebraic techniques to determine the \( x \)-intercept(s), if they exist, and the \( y \)-intercept, if it exists and using algebraic techniques, sketch the graph.
Instructors will help students understand the concept of proof as a chain of inferences. How will the instructors help students understand this concept?

Many theorems and rules are applied in this course. Students learn the standard proof techniques of deductive systems and how many theorems are proved from others. For example, the Remainder Theorem is proven from the Division Algorithm and the Factor Theorem is proven from the Remainder Theorem.

Students can be guided through proof of certain theorems. For example, the following guided proof of the Rational Roots Theorem can be discussed.

Suppose that \( A, B, \) and \( C \) are integers and that \( A \) is a factor of the number \( BC \). If \( A \) and \( C \) have no common factors (other than \( \pm 1 \)), then \( A \) must be a factor of \( B \).

\( a) \) Let \( A = 3, B = 12, \) and \( C = 7 \). Verify our conjecture is true.

\( b) \) Let \( A = 20, B = 8, \) and \( C = 5 \). Does this contradict our conjecture?

\( c) \) Given a polynomial with integer coefficients:

\[ a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0 = 0 \quad n \geq 1, \quad a_n \neq 0 \].

Assume that the rational number \( \frac{p}{q} \) is a root of the equation and that \( p \) and \( q \) have no factors, other than 1, in common, then the following equation must be true:

\[ a_n \left( \frac{p}{q} \right)^n + a_{n-1} \left( \frac{p}{q} \right)^{n-1} + \cdots + a_1 \left( \frac{p}{q} \right) + a_0 = 0 \]

\( d) \) Show that the equation above can be written:

\[ p \left( a_n p^{n-1} + a_{n-1} q p^{n-2} + \cdots + a_1 q^{n-1} \right) = -a_0 q^n \]

\( e) \) Now since \( p \) is a factor of the left side of this equation, it must also be a factor of the right side. But from our original conjecture, \( p \) and \( q \) have no factors in common, thus \( p \) must be a factor of \( a_0 \), as required. It can be similarly proven the \( q \) is a factor of \( a_n \).

The Conjugate Roots Theorem is proved by applying the algebraic relationship between a complex number and its conjugate. Students will demonstrate their understanding that each theorem or rule supplies information which supports the information gained from other theorems or rules and that when all relevant theorems or rules are correctly applied, a consistent picture of a function’s behavior results.

Example 1: Find all roots of the equation: \( x^4 + 10x^3 + 38x^2 + 66x + 45 = 0 \) given that \( -2 + i \) is a root of the equation. In this example students must realize that another root is \( -2 - i \), and by either polynomial division or synthetic division obtain the remaining quadratic equation which they can solve using quadratic techniques.

Instructors will teach students how to apply formal rules of algorithms. How will instructors meet this hallmark?

In addition to the deductive origins noted in the first two hallmarks, many theorems and rules are applied throughout this course. Elements of this course involve the Remainder Theorem, the Factor Theorem, the Rational Roots Theorem, the Fundamental Theorem of Algebra, the Complete Factorization Theorem, the Conjugate Roots Theorem, Descartes’ Rule of Signs, the
Upper Bound and Lower Bound Rules, rules about the multiplicity of a root, and rules about the end behavior, symmetry, and transformations of functions. Irrational roots or polynomial or rational functions that cannot be found by any of the above rules, can be approximated by application of the Intermediate Value Theorem algorithmically.

Example 1: Let \( f(x) = 2x^7 - 2x^6 + 7x^5 - 7x^4 - 4x^3 + 4x^2 = 0 \). Find the following:

a) How many roots ( \( f(x) = 0 \), does this polynomial have?

b) Use Descartes’ rule of signs to determine the number of positive roots.

c) Use Descartes’ rule of signs to determine the number of negative roots.

d) Use the rational roots theorem, parts b and c and the theorem on upper and lower bounds (and a little ingenuity) as aids in finding all real and imaginary roots.

Students will be required to use appropriate symbolic techniques in the context of problem solving, and in the presentation and critical evaluation of evidence. What symbolic technique will be required and in what context? How will presentations and evaluation of evidence be incorporated into the course?

Students are required to know and apply appropriate symbolic rules of algebra. These rules are used to represent elementary functions by equations and to precisely calculate the intercepts, asymptotes, the domain, and points of intersection.

Example 1: For the following pairs of functions find \((f \circ g)(x)\) and \((g \circ f)(x)\). First specify the domain of both \(f\) and \(g\) and then the domain of each composite function: \(f(x) = \frac{x}{x^2 - 1}\), \(g(x) = \frac{x - 3}{2}\).

The domain of \(f\) is: \( \left\{ x \mid x \in \mathbb{R}, x \neq \pm 1 \right\} \) or \((\infty, -1) \cup (-1, 1) \cup (1, \infty)\)

The domain of \(g\) is: \( \left\{ x \mid x \in \mathbb{R} \right\} \) or \((\infty, \infty)\)

\[ (f \circ g)(x) = f\left[ g(x) \right] \]

\[ (g \circ f)(x) = g\left[ f(x) \right] \]

Example 2: Given the rational function: \( r(x) = \frac{4x^2 + 4x - 3}{2x - 5} \). Specify the domain, all asymptote(s) and their defining equation(s), find all intercepts, and sketch the graph.
Students must solve applied problems and demonstrate an understanding that their solution is reasonable and makes sense.

Example 3: A logistic growth model is an exponential function used to model situations where growth is limited by some external factors and is defined by: 
\[ f(t) = \frac{c}{1 + ae^{-bt}}, \]
where \( a, b, \) and \( c \) are constants with \( c > 0 \) and \( b > 0 \).

The logistic growth function 
\[ P(x) = \frac{0.9}{1 + 0.271e^{-0.122x}} \]
models the probability that an American \( x \) years old has some coronary heart disease. Find the following:

a) The probability that a 21-year old has some coronary heart disease.
b) The probability that an 85-year old has some coronary heart disease.
c) At what age is the probability of some coronary heart disease equal to 0.6?

**The course will include computational and/or quantitative skills. What reasoning skills will be taught in the course? What computational and/or quantitative skills will be taught in the course? How will you assess this and provide evidence that students are meeting this hallmark?**

The students will learn and apply many theorems, rules, and algorithms. The student must decide which of these could and should (to be given a more elegant deductive solution) be used to solve a particular problem. Students must learn to analyze and understand what a problem is before they begin to find a solution. For example, if a student is asked to graph a particular function, they should first determine if any symmetry exists or if they can apply a simple transformation before doing calculations to find certain points. Students can be led through guided exercises to develop their analytical skills.

Example 1: The hyperbolic cosine function is defined by 
\[ C(x) = \frac{e^x + e^{-x}}{2}. \]

a) Find the domain of \( C \)
b) Find the y-intercept for the graph of \( C \).
c) Show that \( C(-x) = C(x) \). What does this say about the graph of \( C \)?
d) Sketch the graph for \( x \geq 0 \). (You may need to first calculate a few values)
e) Use the result from part c to complete the left side of the graph, \( x \leq 0 \).

Students must always be mindful of the overall deductive context and preconditions of a theorem, rule or algorithm. For example, students must know that the Rational Roots Theorem can only be applied to polynomials having integer coefficients. They must reason what to do with a polynomial having a non-integer coefficient.

Example 2: Find the rational roots of 
\[ x^3 - \frac{17}{3} x^2 - \frac{10}{3} x + 8 = 0 \]
and then solve the equation.

An observant student will realize that the fractional coefficients can be transformed into integers by multiplying by the least common denominator and then apply the Rational Roots Theorem.
Many real-world applications of elementary functions are studied throughout this course. Faculty teaching Math 135 may choose among the following types of functions for either in-class discussion or student homework.

a) Linear functions can be used to analyze appreciation or depreciation of value, or to compare pricing plans.

Example 1: Suppose a manufacturer buys a new machine that cost $120,000. The life expectancy of the machine is estimated to be ten years and will have a salvage value of $4000 after the ten year period.
   i. Find a linear function for the value of the machine after $t$ years, where $0 \leq t \leq 10$.
   ii. Find the value of the machine after eight years.

b) Quadratic functions can be used to solve maximization or minimization problems involving area or revenue.

Example 2: Suppose the function $p(x) = \frac{1}{4}x + 30$ where $p$ is the selling price and $x$ is the number of items sold. Assume $p$ is in dollars. Find the value of $x$ for which revenue will be a maximum and what the unit price should be. Note: the revenue function is defined as $R(x) = x \cdot p(x)$

c) Third-degree polynomial functions can be used to solve maximization or minimization problems involving volume.

Example 3: An open-top box is constructed from a 6-inch by 8-inch piece of sheet metal by cutting equal sized squares from each corner and then folding up the sides. Let $x$ denote the length of each side of the cutout square.
   i. Write a function for the volume, $V(x)$.
   ii. Find the domain of the function in part i.
   iii. Sketch a graph of the volume function in part ii.
   iv. What is the maximum volume of the box?

d) Rational functions can be used to investigate commonly occurring asymptotic behavior, such as the eventual concentration of a drug in the bloodstream.

Example 4: A drug is injected in a patient and the concentration, $c$, of the drug in the bloodstream is monitored. At time $t \geq 0$ (in minutes since the injection), the concentration (mg/L) is defined by: $c(t) = \frac{30t}{t^2 + 1}$
   i. Find the highest concentration of the drug that is reached in the patient’s bloodstream.
   ii. What happens to the drug concentration after a long period of time?
   iii. How long would it take for the concentration to drop below 0.3 mg/L?
e) Exponential functions can be used to study growth of compound interest or populations.

Example 5: Calculate the present value, if $15,000.00 is needed in 5 years and an interest rate of 10.5% interest is paid and compounded: \(a\) annually, \(b\) quarterly, and \(c\) continuously.

f) Logarithmic functions can be used to study radioactive decay or earthquake intensity.

Example 6: The half-life of the radioactive element plutonium-239 is 25,000 years (premium nuke material). If 16 grams are present initially, how many grams are present after 50,000 years? How many grams are present after 125,000 years?

In all of the given applications, the student’s calculated answers must demonstrate that the results would be reasonable based on their knowledge of the world. Students who are not knowledgeable of the application are expected to research the topic and ensure their answers are viable.

Assessment

Any faculty member assigned to teach Math 135 must become familiar with both the course content and the FS hallmarks. The learning outcomes and FS hallmarks will be assessed by the use of embedded questions on exams. It is the responsibility of the math department liaison to meet with the instructor(s) and ensure that the course learning outcomes and the FS hallmarks are being satisfied. The Math 135 faculty will meet, beginning with the spring 2011 semester to correlate the learning outcomes with the appropriate hallmark and to specify which questions to embed and determine whether the FS hallmarks are being addressed via the specific questions chosen. After the initial assessment, the Math 135 faculty will meet each year for a two year period to determine whether the FS hallmarks are being addressed. After the initial assessment, the Math Faculty will meet every three years for a review of the process.

Syllabus:

See attachment.
Math 135 Precalculus Elementary Functions  
Course Syllabus  
Spring 2016  
Instructor Steve Mandracia  

Office: Building 7, Room 412; Phone: 847-9807  
Email: smandrac@hawaii.edu  
Office Hours: Monday/Wednesday 9 AM – 10:30 AM; Tuesday/Thursday 9 AM – 10:30 AM; 4 PM – 5 PM, or by appointment, or if my office door is open, I am available.  

Class Hours: Tuesday/Thursday 5:30 PM – 6:45 PM  
Room 7/403  
CRN: 24814  

Prerequisite(s): A grade of “C” or higher in Math 103 or placement in Math 135.  

Course Description: This course is a study of elementary functions, including linear, quadratic, polynomial, rational, exponential, and logarithmic functions. Emphasis is placed on those topics that will prove useful to students who plan to take calculus. (3 credits)  

Method of Instruction: Primary method of instruction will be lecture providing practical examples. Specific problems will be assigned for group discussion towards the end of each class session. Weekly quizzes will be given on Thursday at the beginning of the class, except during a week when an exam will be given. Four exams and a comprehensive final exam will be given. The tentative dates are listed in the schedule at the end of this syllabus.  

Course Objectives: In general, the course will prepare students for the study of calculus by  

1) Providing them with skills, knowledge, and mathematical maturity necessary for success in that course.  
2) It will also prepare students for vocations in which knowledge of elementary functions is useful. Completion of this course with a “C” grade or higher satisfies the three credits of quantitative reasoning requirement of many University of Hawaii programs.  

Symbolic Reasoning Objectives: Students will  
Demonstrate an understanding of the beauty, power, clarity, and precision of formal systems through guided practice in problem-solving elementary functions.  
Demonstrate through performances on assessment exams, class work, and homework exercises the concept of proof as a chain of inferences.  
Apply formal rules of algorithms to elementary functions.  
Demonstrate correct and effective use of the symbolic rules of elementary functions on assessment exams, homework exercises, or related projects.  
Analyze rules and theorems to find the most effective solutions to problems.  
Apply principles of elementary functions to solve real world problems.  

Course Specific Learning Objectives: Students will  

- Solve linear, quadratic and rational inequalities  
- Use interval notation  
- Solve absolute value equations and inequalities  
- Find domains and ranges of functions, including sums of functions and composite functions  
- Recognize odd and even functions (symmetry)  
- Define continuous and discontinuous functions  
- Transform functions, including vertical and horizontal translations  
- Use function notation  
- Perform operations on functions, including addition, subtraction, multiplication, division, and composition of functions  
- Define and graph inverse functions  
- Graph piecewise defined functions  
- Find all complex zeros of polynomial functions  
- Graph general polynomial functions  
- Graph rational functions including horizontal, vertical, slant and curvilinear asymptotes
• Graph radical functions
• Graph exponential and logarithmic functions
• Use the properties of logarithms
• Solve exponential and logarithmic equations
• Solve applied problems of exponential and logarithmic functions

In general, the course will prepare students for the study of calculus by providing them with skills, knowledge, and mathematical maturity necessary for success in that course. It will also prepare students for vocations in which knowledge of elementary functions is useful. Completion of this course with a “C” grade or higher satisfies the three credits of quantitative reasoning requirement of many University of Hawaii programs.

In general, the course will prepare students for the study of calculus by

1) Providing them with skills, knowledge, and mathematical maturity necessary for success in that course.

2) It will also prepare students for vocations in which knowledge of elementary functions is useful. Completion of this course with a “C” grade or higher satisfies the three credits of quantitative reasoning requirement of many University of Hawaii programs.

Required Materials:


Calculator: A scientific calculator with trigonometric functions will be needed regularly during the semester for use in class and for homework assignments.

Important Dates:

Holidays:
• January 18, 2016  Martin Luther King Jr. Day Holiday
• February 15, 2016  President’s Day
• March 4, 2016  Excellence in Education Conference.
• March 21-25, 2016  Spring Break

Drop Period:
• March 14, 2016  Last day to apply for spring graduation.
• March 29 2016  Last day to change to CR/NC and Audit grading options.
• January 15, 2016  Last day to receive 100% tuition refund; (No “W” on transcript).
• February 1, 2016  Last day to receive 50% tuition refund and Last day to drop (No “W” on transcript).
• March 29, 2016  End of drop period. Last day to withdraw from class (“W” on transcript).
• April 01, 2016  Last day to Change Major for Fall 2016 Early registration.

Last day of Instruction:  May 4, 2016.

Classroom Rules of Conduct: Students are expected to understand and follow the course requirements as presented by the instructor, to act with respect towards their instructors, fellow students, and others with whom they may interact in the course of their studies, and to complete all work required for their courses to the best of their ability. Student, in turn, may expect to be treated with respect and evaluated fairly based on their academic performance. No food or drinks are permitted in the classroom. Radios, cd/mp3 players, ipod, etc are not allowed. Cell phones should be set on vibrate or turned off.

Attendance: Students are expected to attend every class, arrive on time, and plan to stay for the entire class. Please discuss any anticipated or unexpected absences with me. If possible, please leave a message on my phone, or send me an email. It is the responsibility of the student to obtain lecture notes and to arrange any make-up work with me. Points are not awarded for attending class, however, nonattendance will be a consideration in the student’s final grade. If you do not attend class, do not expect to pass.
No Show: Students must attend the first two classes of the semester. It is the student’s responsibility to notify the instructor of anticipated or unavoidable absences. A student not attending the first two classes of the semester will be classified as a no-show and may be dropped from the class.

Disapperer Policy: Students who stop attending class or never attended class are considered “Disappearers.” A student classified as a disappearer by the official drop deadline may receive an “F” grade. If a student has a justifiable reason for temporarily missing class, it is his or her responsibility to contact the Instructor, Division Chair, or Program Dean to resolve the situation.

Students with Disabilities: In accordance with Section 84.4 of the Federal rules and regulations governing Section 504 of the Rehabilitation Act of 1973, no qualified individual with a disability shall, on the basis of their disability, be excluded from participation in, be denied benefits of, or otherwise be subjected to discrimination under any program or activity which receives benefits from Federal financial assistance.

Grade Policy:

Exams: Four exams and a comprehensive final exam will be given. Each exam is worth 100 points and the final is worth 150 points. The tentative exam schedule is listed on the course schedule at the end of this syllabus. In addition, a reminder will be provided, announcing an exam, one week in advance. Students are expected to take exams at the announced time. It is understood that circumstances beyond a student’s control may arise that will prevent the student from taking an exam at the scheduled time. It is the student’s responsibility to inform the instructor prior to the exam, if possible. In these cases, a makeup exam will be given at a mutually acceptable time and place. For any unexcused absences, the makeup exam grade will be reduced by 10%.

Quizzes: A quiz will be given each Thursday, covering the material from the previous classes, except on days when an exam is given and during our first meeting. Approximately twelve quizzes will be given and the best ten will account for 100 points of the final grade.

Homework: Suggested homework problems are listed on the last page of this syllabus. Problems for each section are listed in the order in which they will be covered; these problems are for your benefit and will not be collected, but may be used on exams. A set of homework will be assigned each class and collected at the beginning of the next class. Late homework will not be accepted. Homework will account for 100 points of the total grade.

Grading will be based on the following scale: A total of 750 points are possible.
A: 90% - 100%; 675-750 total points;  B: 80% - 89%; 600-674 total points;  C: 70% - 79%; 525-599 total points
D: 60% - 69%, 450-524 total points;  F: below 60%, 449 or less points.

Incomplete grade: An incomplete grade will only be given to a student who is passing, but has not completed an examination or some other required work due to circumstances beyond the student’s control.

“N” Grade: An “N” grade will only be given to students who have made an effort or have extenuating circumstances beyond their control and will need to retake the class. It is the responsibility of the student to request an “N” grade.

Emergency Procedures:
1. Evacuation procedures: see instructions posted in classroom.
2. First aid kit: located in room 414. All instructors have a key to the room.
3. Emergency ambulance: from any office phone, dial “9” for an outside number then “911.”
4. Call campus security; 284-1270.

Recommendations for Success:

Student initiative and determination are crucial elements for the success in mathematics courses. Mathematics courses require more than just reading the material and listening to lectures, working sample problems is of the utmost importance. It is highly recommended that you spend 1 1/2 to 2 hours of outside study time for each hour of class time. To gain a better understanding of the material, I recommend reading each section before it is presented in class and then reread it before working the homework problems. If help is needed, seek it immediately, do not allow yourself to fall behind, as it becomes increasingly difficult to “catch up”. Study groups with classmates are highly encouraged.
Note: This syllabus is intended as a guideline for this course. All information included in this syllabus is tentative and is subject to change at the discretion of the Instructor. The requirements and grading criteria may change during the course, if necessary. Assignments are listed in the order in which the material will be presented.

Assignments from Precalculus; Fifth Edition, by Lial, Hornsby, Schneider, and Daniels, Pearson., c 2013. ISBN 9781256698395

1. Ex 1.3  #17, 19, 21, 23, 28, 33, 55, 61, 65, 74, 85  (Complex Numbers)
2. Ex 1.4  #18, 32, 41, 48, 58, 59, 73, 77, 87, 89  (Quadratic Equations)
3. Ex 1.7  #22, 24, 34, 38, 44, 66, 70, 83, 91  (Inequalities)
4. Ex 1.8  #14, 18, 22, 31, 35, 40, 49, 54,  (Absolute Value Equations/Inequalities)
5. Ex 2.1  #11, 12, 17, 21, 24, 26, 28, 32, 36, 47, 50, 52  (Rectangular Coordinates and Graphs)
6. Ex 2.2  #5, 12, 14, 20, 21, 23, 29, 39, 41, 46, 52  (Circles)

Exam 1 tentative date January 28, 2016

7. Ex 2.3  #4, 5, 11, 20, 21, 29, 32, 37, 45, 46, 56, 7578-81  (Functions)
8. Ex 2.4  #8, 10, 13, 22, 38, 41, 44, 50, 59-64,  (Linear Functions)
9. Ex 2.5  #7, 10, 11, 23, 26, 32, 33, 37, 41, 42, 46, 47, 54, 59  (Equations of Lines/Linear Models)
10. Ex 2.6 #11-16, 24, 28, 29, 37, 41,  (Basic Function Graphs)
11. Ex 2.7 #2, 3, 4, 5, 9, 14, 21, 23, 24, 35-42, 43, 44, 53, 57,  #60, 64, 79, 81,  (Graphing Techniques)
12. Ex 2.8 #11, 14, 24, 26, 30, 37, 40, 45, 47-54, 65, 68, 73,  #76, 84, 86, 87, 91, 97  (Function Operations and Composition)

Exam 2 tentative date February 18, 2016

13. Ex 3.1  #9, 11, 12, 16, 19, 25, 27-30, 31-36, 38, 40, 48,  #49, 53, 56, 58, 64, 73, 81, 84  (Quadratic Functions and Models)
14. Ex 3.2  #7, 10, 14, 19, 22, 27, 31, 32, 36, 40, 46, 48, 50, 56  (Synthetic Division)
15. Ex 3.3  #7, 10, 14, 19, 22, 27, 31, 32, 36, 40, 46, 48, 50,  #54, 68, 71, 77, 80, 84, 86, 93, 97, 102, 105  (Zeros of Polynomial Functions)
16. Ex 3.4  #1-8, 13, 19, 23, 26, 36, 38, 49, 52, 56, 58 62, 101  (Polynomial Function/Graphs/Apps/Models)
17. Ex 3.5  #1-16, 18, 24, 25, 29-36, 38, 40, 42, 67, 74, 92, 94  (Rational Functions/Graphs/Apps/Models)

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18. Ex 4.1  #3-8, 12, 17, 43, 46, 49, 55-58, 65, 67, 74, 75  (Inverse Functions)
19. Ex 4.2  #6-10, 18, 21, 24, 27, 48, 49, 55-58, 67, 69, 73, 76,  #89, 92, 95, 99  (Exponential Functions)
20. Ex 4.3  #2, 4, 5, 8, 9, 14, 20, 23, 28, 34, 40, 43, 45-50, 53, 55,  (Logarithmic Functions)
21. Ex 4.4  #16, 17, 21, 24, 26, 30, 32, 34, 35, 40, 41, 48, 49, 64,  (Laws of Logarithms)
22. Ex 4.5  #12, 15, 19, 29, 33, 41, 46, 49, 56, 61, 64, 73, 74, 81,  (Exponential and Logarithmic Equations)
23. Ex 4.6  #5-10, 12, 14, 19, 21, 23, 26, 33, 39, 40, 44, 49, 51  (Modeling with Exp and Log Functions)

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