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Fall 9-1-2020

### M 151.B01: Pre-Calculus

Ryan Patrick Wood

*University of Montana, Missoula*

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# M 151 – Precalculus – Fall 2020

## Basic Information

Section	CRN	Meeting Times: MTWF	Room	Instructor Contact Information
B01	70080	10 – 10:50 AM	GBB 108 (+ Zoom)	<a href="#">Ryan Wood</a>
R02	70081	11 – 11:50 AM	Zoom	<a href="#">Regina Souza</a>

**Course Coordinator:** Regina Souza

Email: [regina.souza@umontana.edu](mailto:regina.souza@umontana.edu)

Office Phone: 406-243-2166 (for leaving voicemail messages; email is preferred)

Appointments: You can email me, leave a voice message, or use the booking calendar on [my webpage](#).

## Course Catalog Description

Offered autumn and spring. Prereq., ALEKS placement  $\geq 4$ . A one semester preparation for calculus (as an alternative to M 121-122). Functions of one real variable are introduced in general and then applied to the usual elementary functions, namely polynomial and rational functions, exponential and logarithmic functions, trigonometric functions, and miscellaneous others. Inverse functions, polar coordinates and trigonometric identities are included. Credit not allowed for both M 151 and M 121 or 122. Credit hours: 4

## Learning Outcomes

Upon completion of this course, students will be able to:

1. Demonstrate conceptual understanding of functions and solve problems using four different points of view: geometric (graphs, pictures), numeric (evaluation, tables), symbolic (formulas, trigonometric identities), and written (verbal descriptions and interpretations).
2. Be flexible and have the ability to choose between these points of view when solving problems such as evaluating functions; solving equations; identifying where a function is increasing, decreasing, positive, or negative; finding domain and range, intercepts, slope, vertex, concavity, symmetries, periodic behavior, end-behavior, and asymptotes.
3. Use similarity of triangles and symmetries of the circle to compute trigonometric ratios and to obtain basic relationships between them. Compute the values of special angles in degrees or radians. Choose between the Pythagorean theorem, law of sines or law of cosines when solving right or oblique triangles.
4. Create graphs when given a formula; write a formula when given a graph. Convert between Polar and Cartesian coordinates, plot points and graph polar equations.
5. Build new functions from existing ones: using transformations, composition, and the algebra of functions. Identify when a function has an inverse. Identify domain and range, graph and compute a formula for the inverse, when possible.
6. Describe real world situations using linear, quadratic, piecewise, polynomial, power, rational, exponential, logarithmic and trigonometric functions, and interpret functions and their parameters in real word contexts.

## General Education Learning Outcomes

Upon completion of the mathematical literacy requirement, a student will be able to apply effectively mathematical or statistical reasoning to a variety of applied or theoretical problems.

## Required Textbook

Chapters 1-4 of [Precalculus: An Investigation of Functions \(Edition 2.1\)](#) by David Lippman and Melonie Rasmussen (free to download). You can download it from the website directly or from a folder to Moodle. **If you prefer a bound printed copy, order it as soon as possible.**

## Course Content

1. *Graphs, Functions, Applications* (Function Notation, Linear Functions, Equations of Lines, Applications, Solving Linear Inequalities, Increasing, Decreasing, and Piecewise Functions, Algebra of Functions, Composition of Functions, Symmetry and Transformations)
2. *Exponential and Logarithmic Functions* (Inverse Functions, Exponential and Logarithmic Functions and their Graphs, Exponential and Logarithmic Equations, Applications.)
3. *Trigonometric Functions* (Trigonometric Functions and their inverses, Applications, Arc Length, Graphs, Identities (Sum, Co-function, Double-Angle), Trigonometric Equations, Polar Coordinates.)
4. *Polynomial and Rational Functions* (Power Functions, Quadratic Functions, Long run and Short-run Behavior of Polynomial and Rational Functions, Graphs, Comparing Power, Exponential and Logarithmic Functions, Applications.)

## Policies for Quizzes, Tests, and the Final

There is a separate document, available on Moodle under “Course Information”. It describes the policies for remote exams; they may have to be updated during the semester.

## Calculators

Calculators can be a useful tool for mathematics, making computations less tedious and aiding in exploration of sound mathematical intuition. However, we must be careful. Relying too heavily on calculators can hinder the development of reasoning, estimation, and mental mathematics skills. Plus, it's important to be able to trust your own brain's computational power. Calculators can make mistakes too, and you will never find these mistakes unless you can do enough math in your head to say “That doesn't look right ...” For these reasons, **calculators will NOT be allowed on parts of exams.** In class and on homework we will make computations and graphs with [Desmos](#) and [WolframAlpha](#). Geogebra is also a good tool (apps can be downloaded and used offline).

## Course Calendar

Dates	Topic
August 27 (5 pm)	Last day students can add a course on CyberBear
<b>September 4</b>	<b>Test 1</b> (part in class, part take-home)
September 9 (5 pm)	Last day students can drop a course on CyberBear or change grading option to audit
<b>September 25</b>	<b>Test 2</b> (part in class, part take-home)
<b>October 16</b>	<b>Test 3</b> (part in class, part take-home)
October 21 (5 pm)	Last day to add/drop course by paper w/o Dean's approval.
<b>November 6</b>	<b>Test 4</b> (part in class, part take home)
November 18 (5 pm)	Last class day, and last day to petition to drop/add and change to CR/NCR
<b>November 19 – 25</b>	<b>Final exam</b> (part in class, part take-home) <b>See dates on table next page.</b>
<b>November 23</b>	<b>Alternative date:</b> Monday, November 23, 5:30-7:30pm

## Grading Policy

Item	Percentage of Course Grade
Reading Quizzes (Moodle)	8%
WeBWork (online homework)	8% problem sets + 8% review for tests
Quizzes	8%
Projects	8%
Four midterm exams	40% (10% each)
Cumulative final exam	10% (in class) + 10% (take-home)
Showing progress at the end / flexibility	The scaled in class part of the final exam can replace any of the other items when computing the course final grade.

## Grade Scale

Cutoff Percentage:	93%	90%	87%	83%	80%	75%	70%	65%	62%	58%	55%
Grade:	A	A-	B+	B	B-	C+	C	C-	D+	D	D-

## Some strategies to complete this course successfully

### Check you have the prerequisites

You need an Aleks placement level 4,  $M02 \geq 17$ , or consent of instructor.

### Check this course is relevant to your educational goals

Take this course because you are interested in learning the material, because you have a purpose. It is hard to stay motivated otherwise.

### Prepare (Read the Textbook and Complete the Reading Quizzes)

Before a new topic is introduced, you will be asked to read the section and to work on a Moodle quiz. The intended learning outcome is to increase your skills of retrieving mathematical information from a textbook, and to learn to assess how much you understand. The last quiz question will be a request for feedback, opening up the lines of communication between each individual student and the instructor.

### Practice Together (Attend Classes and Engage in the Learning Activities)

Showing up regularly to class is the key to successfully completing this course. You will be given a chance to practice with your instructor and classmates right there with you. Attendance will not be part of the grade; we will check face-to-face attendance for contact tracing.

### Daily Individual Practice (Complete the WebWork Assignments)

One of the best ways to learn mathematics is to do mathematics. Regular online homework assignments ([on WeBWork](#)) are due Monday, Tuesday, Wednesday and Friday at 11:59 PM and the day before a test, at 8 PM. Please complete each assignment to the best of your ability 24 hours prior the deadline so you can identify any issues you would like to be discussed (in class, via email, in the Math Learning Center, or maybe with a classmate) before the homework closes. Expect at least 2 hours of work outside class every day.

### Integration (Complete the Projects, Practice Tests and Review Assignments)

After we understand something piece by piece, it is time to construct an overview picture. The projects are designed to apply what you learned, using mathematical models (functions) to enrich your understanding of a particular case scenario. The requirement is to approach it from multiple points of view: conceptually (verbally), graphically, numerically (tables), symbolically (formulas) and report (without any mathematical lingo) on what new information you have uncovered. The practice tests and

review assignments will require you to choose a strategy for a particular problem (a skill quite different from the one required when you are doing your daily homework, where most of the time the skill required maybe in the previous page of the textbook, or is similar to something was discussed in class). These activities are best if started individually, and then discussed with others.

## Get Support and Stay in Contact with your Instructor and Classmates

Form study groups, take advantage of the Math Learning Center, contact your instructor. To me, this is the main difference between learning from taking a class and learning from searching information on the WeB or in a textbook. Regardless if you are attending face-to-face or remotely, please let us know if something happens and you need to be absent (especially if you would miss an assignment).

## Assessments (Quizzes, Midterm Exams and Final Exam)

### Reading Quizzes

Due usually Sunday, Monday, Tuesday and Thursday on Moodle (the day a new section starts)

### Quizzes

Weekly, mostly Fridays, but not always, usually during the last 10-25 minutes of class.

### Projects

Total of 4 projects during the semester (see schedule overview)

### Midterm Exams

There will be three 50-minute in-class exams during the semester; part of it will be take-home. If you have a legitimate schedule conflict with an exam, please let me know as early as possible.

### Final Exam

**Unless you can take the exam at the alternative scheduled date** (see below), the final exam is going to be held at the dates scheduled by the registrar's office.

Section	CRN	Date	Times	Room	Instructor
B01 (10 AM)	70080	Thursday, Nov 19	8 – 10 AM	GBB 108	Ryan Wood
R02 (11 AM)	70081	Friday, Nov 20	8 – 10 AM	Zoom	Regina Souza

Tentative alternative date for the final exam: **Monday, November 23, 5:30-7:30 pm on Zoom**. By enrolling in this course, it is understood that you will be present for the final exam. The in class final exam score is worth 10% of your final grade (20% if you choose to take advantage of the flexibility policy).

## Course Guidelines and Policies

### Recording of Class Meetings

Because we want to be prepared if one of us has Covid symptoms, class meetings will be recorded via Zoom (work done in the break out rooms will not be recorded). I will let you know if this policy changes.

### Classroom and Course-related Behavior

University policy requires that all of us in the classroom treat each other with respect, and refrain from behavior that will disrupt the educational process. Please refrain from using any electronics during class that are not directly related to what we are doing. If you would prefer to be called by a **different name, or gender pronoun**, than listed on the course roster, please let your instructor know.

## Student Conduct Code

All students need to be familiar with the [Student Conduct Code](#). You can find it in the “A to Z” index on the UM home page. In particular, discrimination and harassment are not tolerated at the University of Montana. If you feel that you have been subjected to discriminatory or harassing behavior, please contact the [Office of Equal Opportunity and Title IX](#) at 243-5710 or read [UM’s Policy on Discrimination, Harassment, Sexual Misconduct, Stalking, and Retaliation](#) for help in addressing the situation. You can also report the discrimination or harassment to me or to another faculty member or advisor you trust.

## Academic Honesty

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University.

## Disability Modifications

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and [Disability Services for Students](#). If you have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154 or call 406.243.2243. I will work with you and Disability Services to provide an appropriate modification.

## Statement on Digital Access

Digital devices (like laptops and cell phones) are becoming increasingly important to success in college. In this course, you may need digital devices to access readings, complete and submit written assignments, complete online quizzes, verify your attendance, take in-class polls, and more. I recognize that some students are unable to afford the cost of purchasing digital devices and that other students rely on older, more problem-prone devices that frequently break down or become unusable. I also recognize that those technology problems can be a significant source of stress for students. Given those challenges, I encourage students to contact me if they experience a technology-related problem that interferes with their work in this course. This will enable me to assist students in accessing support.

## Due Dates and Late Work

**Extensions for Reading Quizzes and Webwork Assignments:** If you cannot meet a deadline for a good reason, contact your instructor before the due date has passed, and we will usually be able to give you an extension. (If this policy is abused and we receive too many extension requests, we might have to change this policy and only grant extensions in cases of documented illness or other exceptional circumstances beyond your control.)

**Except in exceptional circumstances, quizzes/exams must be taken at their scheduled time.** If you know you have a conflict with a quiz/exam, please contact me or your instructor **early** to see what arrangements can be made.