

# MATH M27 – Precalculus Mathematics

Fall Semester, 2021

11:15-12:05 SE245 every day

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**Office Hours:** 4-5pm MF

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## Prerequisite:

Two years of high school algebra as evidenced by the math placement test or by completion of Math M014, and one year of high school geometry. Students should not enroll concurrently in M014 and M027.

## Course Description:

Designed to prepare students for *M211: Calculus 1*. **Students planning to take *M119: Brief Survey of Calculus 1* should consider taking M025 instead.**

Credit may not be applied toward a degree in the College of Arts and Sciences; and a minimum grade of C- is needed to satisfy the College of Arts and Sciences mathematics fundamental skills requirement. Does not carry IUB GenEd MM or N&M credit.

## Learning Objectives:

Learning objectives for the Precalculus portion of Mathematics M27 include but are not limited to the following:

1. Students should be proficient at solving equations to find all solutions, real and complex, using the quadratic formula and a variety of factoring techniques including grouping, common patterns such as the sum of cubes, as well as synthetic and long division.
2. Students should be proficient at graphing and working with a variety of functions, without the assistance of a calculator, including polynomial, piecewise, rational, logarithmic, and exponential functions to solve practical examples as well as story problems.
3. Students should fully understand definitions and properties for essential concepts including: relations, functions, and one-to-one functions; the relationship between a function and its inverse; the domain and range of a function; even and odd functions; increasing and decreasing functions; symmetries of functions; and basic operations and composition of functions.

Learning objectives for Trigonometry portion of Mathematics M27 include but are not limited to the following:

1. Students should be proficient at applying the 6 basic trigonometric functions using both a rectangular and unit circle approach to find quantities such as angles, the length of a side, the circumference of a circle, and area, in solving both computational exercises as well as word problems.
2. Students should become proficient at graphing and interpreting graphs of trigonometric functions. This includes performing vertical and horizontal shifts, reflections across axes, and stretching/compressing the graph. Graphs of the standard six trigonometric functions and their inverse trigonometric functions are covered.
3. Students should be proficient at deriving and applying standard trigonometric formulas including the cofunction, addition/subtraction, half and double angle, as well as the Law of Sines and Law of Cosines.
4. Students should become proficient at providing a mathematical argument with the expected format, details, and rigor. This includes verifications of trigonometric identities and mathematical induction.

### **Textbook:**

*Algebra and Trigonometry with Analytic Geometry*, by Earl Swokowski and Jeffery Cole, either the custom or the Classic 12<sup>th</sup> edition. (Thomson Brooks/Cole, 2010). The textbook is available through the IU Bookstore and may also be purchased directly from the publisher online at

<https://www.cengage.com/c/algebra-and-trigonometry-with-analytic-geometry-classic-edition-12e-swokowski/9780495559719PF/>

In addition to the textbook you will need an access code for the Enhanced WebAssign package in order to access the online homework, tutorials, and the class gradebook. **The EWA code comes packaged with the Custom edition from the IU Bookstore.** If the book is purchased elsewhere, the EWA code may be purchased online directly on the online homework website at <https://www.webassign.net/login.html>

Prices and textbook options between the IU bookstore and the publisher vary considerably. I encourage you compare the prices before buying. Doing so could save you a significant amount of money. Once you open the packaging for the Custom edition sold by the IU Bookstore, you will not be able to return it.

### **Calculator Policy:**

We are allowing students to use any calculator – scientific or graphing. This can be a “physical” calculator or an online calculator.

While you are solving the homework problems and learning the material, you should strive to show your work clearly, concisely, and completely. You will need to do this on quizzes and exams to earn full credit. This also applies if a calculator is being used.

Some questions on quizzes and exams may be designed to test understanding of the mathematical concepts and techniques without the benefit of a calculator. To learn the material, it will be important to focus on understanding the concepts and purpose behind each computational step. If one memorizes a pattern or steps, without knowing their purpose, very little is learned and this knowledge is not retained for long.

## **Technology requirements:**

Students are expected to have access to reliable wifi; a device to access canvas, webassign, and Zoom.

For technical assistance, please call University Information Technology Services (UITS), 812.855.6789. They are open 24 hours a day.

## **Attendance Policy:**

Most students find the material in M027 to be significantly more difficult than their high school math classes. Attending and participating in every class is crucial to your success in this course. A student absent from class bears full responsibility for all material covered and announcements made in class. Missed homework assignments, regardless of the circumstances, will not be accepted late and cannot be made up. Instead, a few of the lowest scores from the homework, will be dropped at the end of the semester. See the homework section for more detail.

## **Holidays:**

Labor Day- September 6

Fall break- October 8-10

Thanksgiving recess- November 21-28

## **Withdraw Deadlines:**

Withdraw with an automatic grade of W – Friday, December 10

Further information regarding schedule adjustment fees, refunds and deadlines can be found on the website of the Office of the Registrar: <https://utilities.registrar.indiana.edu/calendars/official-calendar/>

## **Academic Integrity:**

The IU Department of Mathematics takes academic integrity very seriously. As a student at IU, you are expected to adhere to the standards and policies detailed in the Code of Student Rights, Responsibilities, and Conduct (Code), concerning academic misconduct or personal misconduct. Procedures for imposing academic and disciplinary sanctions are outlined in the Code, which can be found at <http://studentcode.iu.edu/>

When you submit an assignment with your name on it, you are signifying that the work contained therein is yours, unless otherwise cited or referenced. Any ideas or materials taken from another source for either written or oral use must be fully acknowledged. All suspected violations of the Code will be reported to the Dean of Students and handled according to University policies. Sanctions for academic misconduct may include a failing grade on the assignment, reduction in your final course grade, and a failing grade in the course, among other possibilities. If you are unsure about the expectations for completing an assignment or taking a test or exam, be sure to seek clarification beforehand.

## **Note Selling:**

All class materials provided by your instructor are considered property of the instructor and the Math Department. Giving or selling any class materials to anyone outside of the class will be considered academic misconduct. Violations of this policy will be reported to the Dean of Students as academic misconduct (violation of course rules). Sanctions for academic misconduct may

include a failing grade on the assignment for which the materials were shared, a reduction in your final course grade, or a failing grade in the course.

Additionally, you should know that distributing an instructor's course materials individually or on behalf of one of these commercial services using IU email or via Canvas may also constitute a violation of IU information technology and IU intellectual property policies and additional consequences may result.

### **Cell Phones & Pagers:**

Please turn these off or set them on silent mode. The material is difficult enough without unnecessary interruptions.

### **Webpages:**

The IU Department of Mathematics web page offers quick access to information about their courses and programs at <http://www.math.indiana.edu>

Canvas is at <https://canvas.iu.edu/lms-prd/app>

### **Communication:**

Preferred means of communication will vary by instructor. Email, office hours, in class and canvas mail are all common. Be sure you know the most effective way and time to speak with your instructor.

Whatever online means of communication your instructor uses, you are expected to check it regularly, preferably daily. You are responsible for the information sent to you individually and to the class.

To protect confidentiality, students are strongly encouraged to use canvas or the IU email system, rather than another server mail system. Furthermore, given the prevalence of spam and viruses, your instructor may not always open email messages with unrecognizable addresses and/or subject headings

### **Help Outsidess of Class:**

There will not be enough time to answer all questions from the homework assignments, exams, and other M27 material. Several options for help outside of class are available:

- Come to class a few minutes early. Your instructor may be available for a few questions.
- Visit your instructor during office hours or make an appointment to meet with them.
- Math help is available in the Math Learning Center (MLC). The MLC will be available for tutoring help Monday through Friday. To find out more about the MLC tutoring schedule and other general information, please visit the MLC web page at <https://math.indiana.edu/student-portal/undergraduate/academic-support/math-learning-center.html>
- Math help is available in the Academic Support Center. Starting Sunday, January 24, the ASC is open Sunday through Thursday 7-11 pm. For more information about the ASC please visit <https://academicsupport.indiana.edu>

## Homework:

In class, there will only be time to go over a few problems from each section; the answers to the odd problems are in the back of your textbook. You may want to form a study group and get help outside of class. See the comments on the previous page for more information. You should expect to spend several hours each day working problems and reading the sections as they are discussed in class.

There will be two types of homework assignments: written homework and online homework.

**Written homework assignments:** There will be a weekly written homework assignment containing about 10-20 problems, a few from each section covered that week. Two of the lowest written assignment scores will be dropped. To receive full credit for the problems, you will need to show your work clearly, concisely and completely. Little to no credit will be given to correct answers without the appropriate work. If you use a calculator, you are expected to show sufficient work to explain the process of arriving at the solution.

**Online homework assignments:** Done on the WebAssign homework system. There will be one assignment per section. These assignments will generally be due a few days following discussion of the material. Once you have submitted your answers the work is automatically saved. However, saving the answers does not submit them.

To access the Webassign homework system go to <https://www.webassign.net/login.html>. You will be prompted to enter an access code, purchase the code online, or enter a code later. Before you purchase a code online, be sure that one did not come with your textbook. There is an initial grace period or “free trial” of two weeks after which you will need to have entered an access code to be able to access your homework assignments.

It is up to you to register and access the WebAssign system and begin working on your first assignments right away. If you have any difficulties accessing or using WebAssign, please call their technical support at 800.955.8275 or bring your questions to the MLC.

Late homework will not be accepted for any reason for either the written or WebAssign homework. Any assignment not turned in on time will receive a zero. To allow for unexpected conflicts a few of the lowest assignment scores will be dropped.

## Exam Dates:

Diligence with homework is critical to finding success in any math class. To adequately prepare for the exams, you should also do many similar textbook problems and complete past exams.

|             |                                  |                         |
|-------------|----------------------------------|-------------------------|
| Exam 1:     | Chapters 1 through 3             | Wednesday, September 22 |
| Exam 2:     | Chapters 4 and 5                 | Thursday, October 14    |
| Exam 3:     | Chapters 6 and 7                 | Thursday, November 11   |
| Final Exam: | Chapters 1-7, 8.1-8.4, 10.1-10.3 | To be announced soon!   |

Exams 1, 2, and 3 will be given during your regular class time and in your normal classroom. As indicated above the Final Exam will be given outside of the regular class meeting time.

### **Make-up exams are given only in extenuating circumstances such as medical emergencies.**

You will be expected to provide appropriate documentation in a timely fashion. If you have a schedule conflict, please discuss it with your instructor as soon as possible.

## Assessment:

Grades will be determined using the scores from the following assignments:

|                  |            |
|------------------|------------|
| Online Homework  | 17%        |
| Written Homework | 8%         |
| Exam 1           | 15%        |
| Exam 2           | 15%        |
| Exam 3           | 15%        |
| Final Exam       | <u>30%</u> |
|                  | 100%       |

**Do not rely on a curve to be used on the exams. There will be a limited amount of extra credit available to count only towards your quiz and homework averages. No additional extra credit will be available. Plan to do all assignments to the best of your ability.**

**A grade of an A or B in M027 is an indication that a student is adequately prepared for M211.**

**Students earning a C in M027 rarely earn an A or B in M211, sometimes manage a C, but most often fail or receive a D.**

**Students with less than a C in M027 rarely earn more than a D in M211. They should retake M027 before attempting M211.**

**Furthermore, to be adequately prepared, students planning to take M212 should receive an A or B in M211.**

## Grade Scale:

Grades are computed using the standard scale:

|                   |                             |
|-------------------|-----------------------------|
| 97%, 93% and 90%  | for grades of A+, A and A-  |
| 87%, 83%, and 80% | for grades of B+, B, and B- |
| 77%, 73%, and 70% | for grades of C+, C, and C- |
| 67%, 63%, and 60% | for grades of D+, D, and D- |
| Below 60%         | is an F                     |

## **Special Services:**

Students needing special accommodations because of a disability must first register with *Disability Services for Students* and provide their instructors with the appropriate forms issued by DSS before accommodations may be given. Information regarding DSS can be found at <https://studentaffairs.indiana.edu/student-support/disability-services/index.html>

The assessment and registration process can be time-consuming, especially near midterms. If you believe you may qualify for accommodations, you should consult with DSS as soon as possible. Students are expected to provide their instructors with at least 2 weeks advance notice to arrange appropriate exam accommodations.

## **Religious Holiday Policy:**

Accommodations will be made for university recognized religious holidays provided the student notifies the instructor in writing using the "Request for Accommodation for Religious Observance Form" by the end of the second week of class. For more details on this policy and the downloadable form please visit <http://enrollmentbulletin.indiana.edu/pages/relo.php?Term=1>

## **Course Coordinator:**

Questions and problems relating to this course **should be first directed to your instructor** and then, if necessary, to the course coordinator, Bartosz Langowski, by email at [balango@iu.edu](mailto:balango@iu.edu).

## Math M27 Spring 2021 Class Schedule

| <b>Week Beginning</b>      | <b>Monday</b>         | <b>Tuesday</b>        | <b>Wednesday</b>      | <b>Thursday</b>       | <b>Friday</b>         |
|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| August 23 <sup>rd</sup>    | Introduction/1.1      | 1.2                   | 1.3                   | 1.4                   | 2.1                   |
| August 30 <sup>th</sup>    | 2.2                   | 2.2                   | 2.3                   | 2.4                   | 2.5                   |
| September 6 <sup>th</sup>  | Labor Day             | 2.6                   | 2.7                   | 3.1                   | 3.2                   |
| September 13 <sup>th</sup> | 3.3                   | 3.4                   | 3.4                   | 3.5                   | 3.6                   |
| September 20 <sup>th</sup> | 3.7                   | Review                | <b>Exam 1</b>         | 4.1                   | 4.2                   |
| September 27 <sup>th</sup> | 4.3                   | 4.4                   | 4.5                   | 4.5                   | 4.6                   |
| October 4 <sup>th</sup>    | 5.1                   | 5.2                   | 5.3                   | 5.4                   | Fall Break            |
| October 11 <sup>th</sup>   | 5.5                   | 5.6                   | Review                | <b>Exam 2</b>         | 6.1                   |
| October 18 <sup>th</sup>   | 6.2                   | 6.3                   | 6.4                   | 6.5                   | 6.5                   |
| October 25 <sup>th</sup>   | 6.6                   | 6.6                   | 6.7                   | 7.1                   | 7.1/7.2               |
| November 1 <sup>st</sup>   | 7.2                   | 7.3                   | 7.3                   | 7.4                   | 7.4                   |
| November 8 <sup>th</sup>   | 7.6                   | 7.6                   | Review                | <b>Exam 3</b>         | 8.1                   |
| November 15 <sup>th</sup>  | 8.1/8.2               | 8.2                   | 8.3                   | 8.3                   | 8.4                   |
| November 22 <sup>nd</sup>  | Thanksgiving<br>break | Thanksgiving<br>break | Thanksgiving<br>break | Thanksgiving<br>break | Thanksgiving<br>break |
| November 29 <sup>th</sup>  | 8.4                   | 10.1                  | 10.2                  | 10.3                  | 10.3                  |
| December 6 <sup>th</sup>   | Review                | Review                | Review                | Review                | Review                |
| December 13 <sup>th</sup>  |                       |                       |                       |                       | <b>Final Exam</b>     |

**The date of the Final Exam is yet to be announced!**