PURDUE UNIVERSITY® FORT WAYNE

**Course Information for
MA 15300 and MA 15400
Purdue University Fort Wayne**

1. The Course Goals

Many students take this course because it is required for their degree. But there are better reasons than that!
In *College Algebra* (MA 15300), *Trigonometry* (MA 15400), and *Precalculus* (MA 15900) you will:
- Highlight the link of mathematics to the real world.
- Develop a wide base of mathematical knowledge, including
  o basic skills and concepts,
  o a functional view of mathematics, including graphical, algebraic, numerical, and contextual viewpoints,
  o properties and applications of some of the basic families of functions
  o geometric visualization,
  o problem solving, predicting, critical thinking, and generalizing.
- Incorporate the use of general academic skills such as
  o communicating mathematics concepts,
  o understanding and using technology, and
  o working collaboratively.

*The above aligns with the foundational intellectual skills for quantitative reasoning in the **Indiana College Core** and is based on the guidelines of the Mathematical Association of America's subcommittee, **Curriculum Renewal Across the First Two Years** (CRAFTY).*

2. General Education Course Learning Outcomes

College Algebra and Trigonometry addresses all eight outcomes in Area 3: Quantitative Reasoning of the Indiana College Core (listed below). Through hands-on activities and assessments you will
- create and interpret mathematical models to solve problems presented as real world situations,
- formulate, validate, and analyze solutions to problems using mental, paper and pencil, algebraic, and technology-based techniques as appropriate
- utilize graphing calculators to find the solution to problems which cannot be solved by pencil and paper, as well as explore mathematical patterns and visualize mathematical ideas,
- recognize and cite assumptions made in real world problem solving, and
- communicate your reasoning.

Indiana College Core Area 3 Quantitative Reasoning Competencies
Interpretation and Representation
3.1. Interpret information that has been presented in *mathematical form**.
3.2. Represent information/data in *mathematical form** as appropriate
  **mathematical form* = functions, equations, graphs, diagrams, tables, words, and geometric figures.
Mathematical Procedures
3.3. Demonstrate skill in carrying out mathematical (e.g. algebraic, geometric, logical, statistical) procedures flexibly, accurately, and efficiently to solve problems.
Critical Thinking
3.4. Analyze mathematical arguments, determining whether stated conclusions can be inferred.
Application / Analysis
3.5. Communicate which assumptions have been made in the solution process.
3.6. Analyze mathematical results in order to determine the reasonableness of the solution.
3.7. Cite the limitations of the process where applicable.
Communication
3.8. Clearly explain the representation, solution, and interpretation of the math problem.

Click **HERE** for more information about the Indiana College Core.

3. Study Time Outside of Class

This course requires a solid effort. During the Fall or Spring Semester, the faculty at PFW expect you to study a minimum of 6 hours a week outside of class working on mathematics for MA 15300 or MA 15400 and 10 ten hours per week for MA 15900. This pace is accelerated in the summer sessions.

4. Accessibility and Accommodations

If you have a disability and need assistance, special arrangements can be made to accommodate most needs. Contact the Director of Services for Students with Disabilities (SSD). They are located at Walb Student Union, Room 113, telephone (260)481-6658, as soon as possible to work out the details. Once the Director has provided you with a letter attesting to your needs for modification, bring the letter to your instructor. For more information, please visit the Web Site for SSD: **pfw.edu/ssd/** .

5. Prerequisite Skills

MA 15300, MA 15400, and MA 15900 are intended for students who have completed two years of high school algebra. The prerequisite for MA 15300 or MA 15900 is completion of Intermediate Algebra MA 11100 with a B- or higher or placement by departmental exam. The prerequisite for MA 15400 is MA 15300 with a C- or higher or placement by departmental exam. Look at the kinds of problems in the Math Background assignment on eHW. If they do not look familiar, perhaps you need to drop the class and take either the prerequisite Intermediate Algebra MA 11100. For those needing MA 15300, PFW does not offer a course lower than MA 11100.

6. Graphing Calculators

Graphing calculators are used for activities and assignments in and out of class. The TI-84 Plus or TI-84 Plus CE is strongly recommended. You may use another equivalent calculator* but you will be responsible for understanding how to use it. Your instructor will be most familiar with the TI-84 Plus or TI-84 Plus CE and may not be able to offer you help with other calculators.

*Your calculator should have features which enable you to find **intersection points**, **zeros (or roots), maximum/minimum points** of graphs, and explore functions numerically with **tables**. If you have questions whether your model of calculator is allowed, ask your instructor.

Graphing Calculator Loan Program: You can rent a TI-84 Plus for the semester for a nominal fee from the Purdue University Fort Wayne Students' Government Association, located in the Walb Student Union Room 225, Telephone 260-481-6586. Supplies are limited and are usually depleted the first week of classes. However, some students may have dropped a class which requires a calculator so one could just be sitting here on a shelf waiting just for you. More information is **HERE**.

7. Computer and Internet Access

Student-access computer labs are located around campus. For a complete list, go to the Information Technology Services Website **HERE**. To use the computers in these labs you must have an activated PFW computer Lab Account, which you received when you enrolled in PFW. For assistance contact the Help Desk at Kettler 206 or email **helpdesk@pfw.edu**. The Help Desk hours are listed on their Website **HERE**.

Borrowing a Laptop or Desktop System: Information Technology Services (Call: 260-481-6030, Email: helpdesk@pfw.edu) has a limited number of laptops and desktop systems that may be loaned to students, faculty, and staff who have internet access available at home. The desktop systems do not have wireless capability, so they must be connected directly to your wireless router via a standard Ethernet cable. Additionally, Helmke Library (Call: 260-481-6505, e-mail: ref@pfw.edu) has a limited number of laptops that may be checked out by students.

8. Office Hours and Free Tutoring

- Instructors' **Office Hours** are open to students in any section. See Brightspace for the current semester schedule.
- **Face-to-Face tutoring** is available in Kettler Hall G19. Hours are posted on Brightspace.
- Use your discussion board on Brightspace as well.

9. **e-Homework (eHW)**

Great news! The Web-based electronic homework system (also called Möbius) will immediately grade your answers and will provide worked-out solutions. It is only $15 for an entire year's worth of access. You will use it for all of your graded work.

Need Help?

Once you are logged in, click on the word **Help** near your name on the top of the screen to access online help. You can also check out the **Möbius Support Site** for help, where you can type a topic in the search box or peruse the popular choices on the page. In addition, you can e-mail **ehwtechsupport@pfw.edu** for troubleshooting. It will be helpful if you can describe the problem in as much detail as possible or provide screenshots.

Getting to the eHW Site

To access eHW, click **HERE**.

Already Have an Account?

If you have already had previous access to Möbius, enter your email and password to login.

If you forgot your password, click on the words **Forgot your password**. You will be prompted for the email for your account, to which a system generated password will be sent. Once you login again you can change it by clicking on your name in the top right corner and then click on **Password Update**.)

Purdue University Fort Wayne

Email or user login

Password

Log in

Create an account

Forgot your password?

Need an Account or License or Enroll in a Class?

If you have not already had previous access to Möbius, click on "Create an account."

For detailed step-by-step instructions on how to create an account, enroll in a class, and purchase a license, see your

Your Work Is Automatically Saved

All of your work is saved up until the last question you were working on, so in case the Internet connection goes down, you have not lost your previous work. You do not have to complete an assignment in one sitting.

How to Submit an Assignment

Be aware that these two buttons behave differently: | Submit Assignment | Quit & Save |

After you complete an electronic homework assignment, the only way for your instructor to receive your grade is if you click on the first button, **Submit Assignment**. Your work will be instantaneously graded and you will see your score.

You would click on the second button, **Quit & Save**, to return to the assignment to work on it later.

If you can see it in your Gradebook link, your instructor can see it as well.

If a time limit is set for a quiz or test, then it counts down from when you started the assignment. If you close your browser (or use the Quit & Save button) before clicking on Submit Assignment, the timer will continue to count down.

How to See Worked Out Solutions

Once you have submitted your assignment and it is graded, click on | View Details | to view your graded assignment and see any detailed feedback that is available, with an option to print.

To make the most out of eHW,

- Try the assignments as many times as you can. You have unlimited attempts before the deadline.
  Subsequent attempts show variations of the problem with the same learning objective.
- Use "Just for Practice" sets to see worked out solutions of problems that are similar to those on your assignment.
  You can click on "How Did I Do?" at each question.
  The "Just for Practice" sets provide you a powerful study technique called *retrieval practice* where you train your brain to bring the correct information to mind that is needed for the task at hand. It moves information from short term memory into long term memory.
- Use the "Flash Cards" to hone in on particular learning outcomes. Many students credit their use of flash cards prior to quizzes and exams as the reason for their high performance.

Questions with Multiple Parts Presented One at a Time

Some questions may be delivered to you one part at a time, such as the one shown below. After you enter your answer, click on **Verify** to move to the next part.

In some questions, the correct answer to the first part of the question may display before you enter the answer to the next part.

Below is an example of a multi-part question with this feature.

(a) What are Purdue Fort Wayne's school colors?

○ watermelon and peach   ○ chartreuse and periwinkle   ○ lemon zest and lime green   ○ **black and gold**

To move to the next part after you enter a response, press **Verify**.

Section   Attempt 1 of 1

Verify

After clicking **Verify,** part **(b)** of the question will display.

(a) What are Purdue Fort Wayne's school colors?

○ watermelon and peach   ○ chartreuse and periwinkle   ○ lemon zest and lime green   ● **black and gold**   ✓

Correct response:

black and gold

To move to the next part after you enter a response, press **Verify**.

(b) In which city is Purdue Fort Wayne located? Hint: It's name reveals the answer.

Click for List ▾

Be sure to complete all parts of the questions.

Section   Attempt 1 of 1

Verify

How to See Your Grades and Past Results

Throughout the semester, you may wish to look at the questions and solutions of past eHW assignments that you completed. The highest score on your assignment appears on the eHW homepage, but you can see all graded attempts by clicking on the link **Gradebook > View Past Results**.

möbius   Gradebook ▾   External ▾

🏠

View Past Results

Grade Reports

For more on using the Gradebook, see the online help by clicking **HERE**.

Working with Math in Responses

You enter formulas using standard mathematical notation similar to that used in a graphing calculator, following the rules for standard order of operations. Some helpful tips follow for entering responses.

Avoiding Common Math Errors

1. ***Exponents:*** Use the caret, ^, for exponentiation, and the letter e for 2.718...
2. ***Parentheses:*** As on a graphing calculator, you must use parentheses.
   When in doubt, you can use the **Preview** option to see it look the way it would in a math text.
   Examples:
   For $2^{x/13}$, you must type `2^(x/13)`

   not `2^x/13`   . . . which would be interpreted as $\dfrac{2^x}{13}$

   For $y = \dfrac{x}{4(x-2)}$, you must type `y = x/(4(x-2))`

   not `y = x/4(x-2)`   . . . which would be interpreted as $\frac{x}{4}(x-2)$

3. ***Multiplication:*** You can type an asterisk (i.e. *) for multiplication, or just type a letter and a number together (i.e. `2x`).

4. ***Square Roots:*** The square root function is `sqrt(x)` or you can just type `x^(1/2)` or `x^0.5` instead. Note again that, like on a graphing calculator, `x^1/2` means $\frac{x^1}{2}$.

5. ***Absolute Value:*** The absolute value function is `abs(x)`, so something like $2|x+1|-3$ would be typed as `2abs(x+1)-3`.

6. ***Argument of Functions:*** You should always place the input of a function in parentheses. For example, for $\sqrt{3x}$ you must type `sqrt(3x)`, not `sqrt 3x` which would be interpreted as $\sqrt{3} \cdot x$

For MA 15400 or MA 15900 students especially:

7. ***π:*** Simply type `Pi` or `pi`. (However, not `PI`.)

8. ***Trigonometric Functions:*** The names for common mathematical functions (sin, cos, etc.) are just what you would expect. The inverse trig functions are arcsin(x), arccos(x), and arctan(x). Also, trigonometric functions are all set to work in radians.

Using the Preview Option in Responses

Use the **Preview** option to view your response as a typeset mathematics expression. **Preview** demonstrates how the system interprets your entry (inspecting it for misplaced parentheses and other unintended keystrokes).

For example, suppose you were to type `sqrt(179)+3/pi` in the box. (Note that this is incorrect.)

Enter the following in the response box.
Type `pi` for π. Use the forward slash key (/) for division.

$$\frac{\sqrt{179}+3}{\pi}$$

TIP: Click on the Preview icon after the box (which looks like 🔍) to check your formula:

`sqrt(179)+3/pi`

Preview ✕

$\sqrt{179} + \frac{3}{\pi}$ 👎

Close

After clicking Preview, you can correct your response before submitting it for a grade.

`(sqrt(179)+3)/pi`

Preview ✕

$\frac{\sqrt{179}+3}{\pi}$ 👍

Close

Nested Parentheses

To computers and graphing calculators,
brackets such as [or]
or braces such as { or }
are not equivalent to parentheses.

For example, to enter $3^{2/(x+1)}$ you would type `3^(2/(x+1))` 👍

as opposed to `3^(2/[x+1])` . 👎

TIP: Using spaces may help readability.
For example, the expression `3^(2/(x+1))` could be typed `3^( 2/(x+1) )` to be read more clearly.
This is where using the **Preview** option, shown above, can be very helpful.

Order of Operations
Order of precedence is as follows:
        Parentheses
        Exponents
           Multiplication and **D**ivision (from left to right)
           Addition and **S**ubtraction (from left to right)

TIP: Some students use the mnemonic:
    Please
    Excuse
      My **D**ear
      Aunt **S**ally

For example, if you were to compute $8 \div 4 \times 2 + 3$, multiplication and division outrank addition, but multiplication and division are the same rank.

$$8 \div 4 \times 2 + 3 = \frac{8}{4} \times 2 \ + \ 3 \ = \ 4 \ + \ 3 \ = \ 7$$

Notice this is what you would obtain from a graphing calculator:

```
8/4*2+3
              7
```
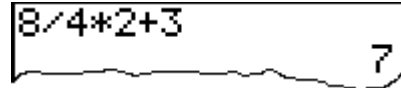
Rules for order of operations are necessary so that a unique value results. Consider the following:

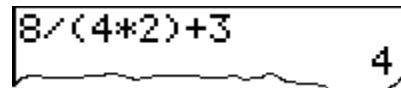$$8 \div 4 \times 2 + 3 \ \neq \ \frac{8}{4 \times 2} \ + \ 3 \ = \ 1 \ + \ 3 \ = \ 4$$

$$8 \div 4 \times 2 + 3 \ \neq \ \frac{8}{4 \times 2 + 3} \ = \ \frac{8}{11}$$

$$8 \div 4 \times 2 + 3 \ \neq \ \frac{8}{4} \ \times \ (2 + 3) \ = \ 2 \times 5 \ = \ 10$$

Parentheses outrank all operations. If your intention is to have $\frac{8}{4 \times 2} \ + \ 3$, the fraction bar serves as a grouping symbol.

The expression $\frac{8}{4 \times 2} \ + \ 3$ is equivalent to $\frac{8}{(4 \times 2)} \ + \ 3$.

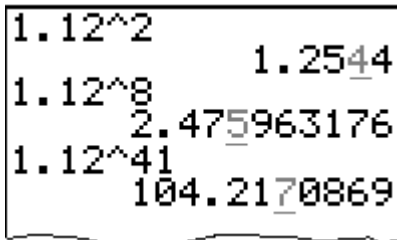So if our intention is $\frac{8}{4 \times 2} \ + \ 3$, we need parentheses: $8 \div (4 \times 2) + 3$.

```
8/(4*2)+3
              4
```

Rules for Rounding

Standard rules for rounding numbers apply.

Look to the right of the rounding digit, which we have underlined.

For example, suppose we are rounding the following calculations to two decimal places.

```
1.12^2
          1.2544
1.12^8
     2.475963176
1.12^41
  104.2170869
```
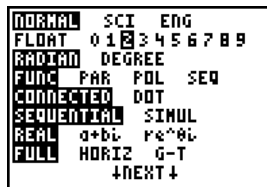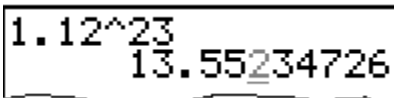
If it is 4 or lower, we truncate. So to two decimal places, $1.12^2 \approx 1.25$

If it is 5 or higher, we round up. So to two decimal places, $1.12^8 \approx 2.48$

and to two decimal places, $1.12^{41} \approx 104.22$

What is 1.12^{23} to two decimal places? Since the digit to the right of the rounding digit is 2, we have $1.12^{23} \approx 13.55$.

```
1.12^23
     13.55234726
```

Your calculator mode can be helpful to report answers to a selected number of digits.

```
NORMAL  SCI  ENG
FLOAT  0123456789
RADIAN  DEGREE
FUNC  PAR  POL  SEQ
CONNECTED  DOT
SEQUENTIAL  SIMUL
REAL  a+bi  re^θi
FULL  HORIZ  G-T
      ↓NEXT↓
```

```
1.12^2
          1.25
1.12^8
          2.48
1.12^41
       104.22
1.12^23
        13.55
```

However, use **caution** when doing so! It is easy to forget to change it back to FLOAT and report incorrect results when you need more precision.

10. Help!

So you're working your hardest, doing the assignments, studying every night, but it's just not enough?

Suggestion 1: If you have purchased the book, read it carefully. Again and again.

Suggestion 2: Do lots of individual homework. Understanding material in later chapters typically requires that you understand concepts in previous ones.

Suggestion 3: Recopy your notes.

Suggestion 4: Problem solving requires persistence. If you don't understand something the first time, you're in good company. Even Einstein had trouble and said, "Do not worry about your difficulties in Mathematics. I can assure you mine are still greater." Don't just give up. Take a break and come back and try again!

Suggestion 5: Remember, there's no substitute for daily preparation. Get help as soon as any problems arise. Which takes you to the next list of resources….

Resource 1. Talk to your instructor. Use the office hours.

Resource 2. Use the features of eHW, including viewing the details of worked out solutions, the *Just for Practice* homework sets, and eHW *Flash Cards*.

Resource 3. Use the supplemental resources in Brightspace.

Resource 4. If you can, connect with other class members outside of class and do your homework together.

Resource 5: Use the free tutoring and Piazza Discussion Board.