Math 115

Intermediate Algebra (3 Credit Hours)

Winter Syllabus

**Instructor**: Kristen Behnke

Room: 113

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**Prerequisites**: MATH 110 or 19 or higher ACT/460 or higher SAT score. Students will need to earn at least a C- or better in order to receive college credit.

**Course Description**: A study of complex fractions, first and second degree equations and inequalities, exponents, radicals, and introduction to complex numbers, logarithms, and systems of equations.

**Learning Outcomes:** Students successfully completing the course will be able to...

1) Solve a variety of equations and inequalities (e.g. linear equations and inequalities with and

without absolute values, quadratic equations, logarithmic equations, exponential equations,

and linear systems in 2 or 3 variables).

2) Construct graphs of functions (linear, exponential, and logarithmic) and determine and apply

characteristics of linear graphs (e.g. calculate slope and intercepts, determine if lines are

parallel/perpendicular, and write equations of lines).

3) Manipulate algebraic expressions (e.g. simplify and factor polynomial and rational

expressions, simplify radical expressions, simplify expressions involving complex numbers,

simplify and expand logarithmic expressions).

4) Solve application problems using algebraic models and graphical representations.

**Textbook:**  Beginning and Intermediate Algebra, An Integrated Approach (7th Edition) by R. David Gustafson, Rosemary M. Karr & Marilyn B. Frisk.

**Course Content**:

Chapter 7: Transitioning to Intermediate Algebra

7.1 Solving Equations/Inequalities in One Variable

7.2 Graphing Linear Equations, Finding Slopes, and Writing Equations of Lines

7.3 Review of Functions

7.4 Factoring and Solving Quadratic Equations

7.5 Rational Expressions and Equations

7.6 Solving Equations Involving Absolute Value

7.7 Solving Inequalities Involving Absolute Value

Chapter 8: Solving Systems of Linear Equations and Inequalities

8.1 Solving Systems by Graphing

8.2 Solving Systems by Substitution & Elimination

8.3 Applications of Systems of Equations in Two Variables

8.4 Solving Systems of Three Linear Equations in Three Variables

8.7 Solving Systems of Linear Inequalities in Two Variables

Chapter 9: Radicals and Rational Exponents

9.1 Radical Expressions

9.2 Application of the Pythagorean Theorem and the Distance Formula

9.3 Rational Exponents

9.4 Simplifying and Combining Radical Expressions

9.5 Multiplying Radical Expressions and Rationalizing

9.6 Radical Equations

9.7 Complex Numbers

Chapter 10: Quadratic and Other Nonlinear Functions and Inequalities

10.1 Solving Quadratics Using the Square-Root Prop. and Completing the Square

10.2 Solving Quadratics Using the Quadratic Formula

10.3 The Discriminant and Equations that Can Be Written in the Quadratic Form

10.4 Graphs of Quadratic Functions

10.5 Graphs of Other Nonlinear Functions

Chapter 11: Algebra, Composition and Inverses of Functions: Exponential and Logs

11.1 Algebra and Composition of Functions

11.2 Inverses of Functions

11.3 Exponential Functions

11.4 Base-e Exponential Functions

11.5 Logarithmic Functions

11.6 Natural Logs

11.7 Properties of Logarithmic Functions

**Student Learning Outcomes:**

Students who have completed MATH 115 are expected to be able to:

1. Solve a variety of equations (e.g. linear, quadratic, rational, radical, absolute value,

exponential, logarithmic, and systems)

2. Solve a variety of inequalities (e.g. linear, absolute value, compound)

3. Graph a variety of functions (e.g. linear, quadratic, exponential, logarithmic)

4. Use standard function notation.

5. Factor algebraic expressions.

6. Find the slope of any line.

7. Write equations of lines.

8. Determine whether lines are parallel or perpendicular.

9. Perform addition, subtraction, multiplication, division of radical expressions

10. Simplify radical expressions.

11. Perform arithmetic operations with complex numbers.

**Tardiness:** Class will begin promptly. Remember, when you are late you are missing out on instruction. If you are tardy, please come in quietly and have a seat. If homework is due that day, make sure that you turn it into the basket before you take a seat. Students are subject to Marlette Community Schools’ attendance policy. Please refer to the tardy policy found in the student handbook.

**Attendance:** It is imperative that you attend classes on a regular basis. Attendance will be taken every day and students are subject to the Marlette Community Schools’ attendance policy. It is the responsibility of the student to get any material missed if an absence occurs. Students are also responsible for knowing the dates of all exams and quizzes throughout the course. Students should plan on being in attendance for these dates. ABSOLUTELY NO MAKE-UP TESTS will be given in the event of an unexcused absence. The following are some examples considered to be unexcused absences but does not constitute the complete list:

1. Transportation issues
2. Oversleeping
3. Work/Job conflict
4. Doctor’s appointments (non-emergency)
5. A family vacation

**Homework:** A complete list of problems for each section will be provided at the end of this syllabus. Students are expected to attempt the homework to the best of their ability and show **all** work. Like with many things in life, practice is what makes us better. To be better at math, it is important that you do the assigned practice problems. There are many on-line resources available to help you if you are struggling. However, simply copying homework answers and work will not help you to achieve true understanding of the topic and will be reflected in your quiz/exam scores. I will collect homework at the beginning of the hour **on the day of the exam review.** I will randomly score between 10 and 20 questions from the chapter. Work is expected to be shown. If only answers are provided, then no credit will be given. Your homework will count for approximately 10% of your overall grade.

**Quizzes/Exams:**  Quizzes and Exams are cumulative. This helps students in retaining information long-term(rather than “memorizing for the moment”). The majority of exams will test students’ knowledge over currently learned material, so it is wise to study those topics first. There will be 5 exams, with the last one being the cumulative semester exam (150 pts). The first four exams will be given after each chapter covered and are worth 100 pts each. Quizzes are short and given either at the beginning or at the end of the class period (as determined by me). Each quiz is approximately 10 points each and will account for approximately 20% of your overall grade.

**Calculators & Other Materials:** During class, we will use the TInspire graphing calculators. These will be used on all tests and quizzes as well. (Cell phones may NOT be used as a calculating device or a timer during any test/quiz.) Students will also want to purchase a 3-ring binder or folder for any handouts, returned quizzes/exams, and homework. It is in your best interest to keep all returned exams/quizzes and homework assignments in case there is a dispute about your grade.

**Grading:** I will drop your lowest homework score and quiz score. Exams will still account for approximately 70% of your overall grade, so preparation for those assessments is vital. Students will earn the following grade based on their cumulative percentage:

93 - 100% A 77 - 79% C+ 60 - 62% D-

90 - 92% A- 73 - 76% C below 60% E

87 - 89% B+ 70 - 72% C-

83 - 86% B 67 - 69% D+

80 - 82% B- 63 - 66% D

**Cell Phone Policy:** Please turn off your cell phone and keep it out of sight during class. Cell phones that go off during class cause a disruption to the learning environment. You will not see my cell phone out or in use during class time, and I ask that you follow my example. Your learning is my priority during this time. It should be your priority as well. Cell phones may **NOT** be used in lieu of a calculator so it is important to purchase a basic scientific calculator.

**Office Hours:** You will have, on average, of one day a week during class to get assistance on homework questions. If you find that you need additional help outside of the classroom, I will be available from 7:45 am - 8:10 am every day and Tuesday & Thursdays from 3:30 - 4:30 pm. If you need to see me on a different day or time, please contact me and schedule an appointment.

**About the Instructor**: I have been teaching in Marlette for the last 20 years. I earned my bachelor’s degree at Eastern Michigan University, where I majored in math and minored in Chemistry. In 2002, I earned my Master’s degree in Mathematics Education from Wayne State University. My husband and I have 3 boys: Blake (16), Carter (14), and Chase (10). We are constantly on the go, but when I have free time I love reading (especially murder mysteries) and being outside. We also have 3 pets: a fox-red lab named Ollie, a black cat named Jinx, and an adopted wild duck that we named Harold! As my older boys joined the Pokemon Go bandwagon this past summer, my nerdy secret addictions became calculus and Scrabble (did you know that QAT and AJI are actual words?)

**Intermediate Algebra Homework Problems**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **7.1** | 4,8,10,19,21,26,31,34,38,39,42,44,46,51,57,62,66,68,73,78,85 | **9.1** | 11-14,19,41,46,49,54,58,59,66,73,74,80,85, 91,94,95,98,108,120 | **11.1** | 24-60 every 3rd,68,73,83,88 |
| **7.2** | 7,10,11,12,19,23,24,33,34,36,39,44,49,53,58, 65,66,72,75,77,80,85, 88,93,98,99,100 | **9.2** | 3-36 every 3rd, 37-40,42,55 | **11.2** | 10,21,25,28,29,32,36,3740,44,47,55,58 |
| **7.3** | 23,25,28,31,35,40,42,47,50,55,56,70,77 | **9.3** | 30-108 every 3rd, 113,128,131,138 | **11.3** | 9,12,14,21,25,27,32,34,35,38,39,51,56 |
| **7.4** | 5,16,22,25,30,33,36,41,46,50,53,58,61,72,78, 81,84,133 | **9.4** | 12,15,24,29,32,41,46, 53,56,61,64,67,72,77, 82,85,90,94,138,139, 140 | **11.4** | TBA |
| **7.5** | 3-45 every 3rd, 50,57,70,87,96,104,116, 117 | **9.5** | 15,18,20,27,30,37,40, 41,45,49,52,57,62,65, 68,74,77,94,101,108 | **11.5** | TBA |
| **7.6** | 9-54 every 3rd,57,62,66 | **9.6** | 18 - 72 every 3rd | **11.6** | TBA |
| **7.7** | 6,7,8,10,20,23,27,32,35, 39,40,43,54,63,64 | **9.7** | 15,17,18,28,31,34,37, 41,44,49,56,61,66,67, 73,78,85,88,92,97,103 | **11.7** | TBA |
| **8.1** | 3- 45 every 3rd,59-62 | **10.1** | 18-81 every 3rd,89,92 |  |  |
| **8.2** | 15,18,19,23,27,30,34,35,39,44,50,63,67 | **10.2** | 12-36 every 3rd, 43,48,54,59,64,67,70 |  |  |
| **8.3** | 6,7,14,15,29,30,33,38,43,45,49,52,65,68 | **10.3** | 1,10,15,20,23,26,28,33  38,45,50,57,62,67,80, 85 |  |  |
| **8.4** | 15,18,19,20,23,36,38,45 | **10.4** | 12-51 every 3rd, 56,70,72 |  |  |
| **8.7** | 18-72 every 3rd | **10.5** | 12-42 every 3rd,45,49 |  |  |

**Approximate Schedule**

\*Snow days and other unforeseen interruptions may cause this schedule to be adjusted.

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| **Date** | **Chapters/Sections** | **Exams/Reviews** | **Date** | **Chapters/Sections** | **Exams/Reviews** |
| Jan 30  Jan 31  Feb 1  Feb 2  Feb 3  Feb 6  Feb 7  Feb 8  Feb 9  Feb 10  Feb 13  Feb 14  Feb 15  Feb 16  Feb 17  Feb 20  Feb 21  Feb 22  Feb 23  Feb 24  Feb 27  Feb 28 | Syllabus & 7.1  7.2  7.2  7.3  Work Day  7.4  7.4  7.5  7.5  Work Day  7.6  7.7  7.7  **No School**  8.1  8.2  8.2  8.3  Work Day  8.4 | Quiz #1  Review  Exam #1  Quiz #2 | Mar 20  Mar 21  Mar 22  Mar 23  Mar 24  Mar 27  Mar 28  Mar 29  Mar 30  Mar 31  Apr 10  Apr 11  Apr 12  Apr 13  Apr 17  Apr 18  Apr 19  Apr 20  Apr 21  Apr 24  Apr 25  Apr 26  Apr 27 | 9.7  9.7  Work Day  10.1  10.1  10.2  10.3  10.3  Work Day  10.4  10.4  10.5  10.5  11.1  11.1  11.2  11.2  11.3  11.3 | Review  Exam #3  Quiz #4  Review  Exam #4 |
| Mar 1  Mar 2  Mar 3  Mar 6  Mar 7  Mar 8  Mar 9  Mar 10  Mar 13  Mar 14  Mar 15  Mar 16  Mar 17 | 8.7  8.7  9.1  9.2  9.3  9.3  Work Day  9.4  9.5  9.5  9.6 | Review  Exam #2  Quiz #3 | Apr 28  May 1  May 2  May 3  May 4  May 5  \_\_\_\_\_\_\_\_\_  **56 Hours**  May 8  May 9  May 10  May 11  May 12  May 15  May 16  May 17 | Work Day  \_\_\_\_\_\_\_\_\_\_\_  11.4  11.4  11.5  11.6  Work Day  11.7  11.7 | Review  Exam #5  Review  Review  Final Exam  \_\_\_\_\_\_\_\_\_\_  Quiz 11.4-11.7 |