Introduction

Congratulations on taking the first step toward a successful math competency exam! This study guide is written as a resource to aid you as you prepare for Wayne State University's Math Competency Exam.

Math Placement

All students, including transfer and guest students, who plan to take MAT 0995, 1000, 1050, 1110, 1120, 1500, 1800 or 2010 as their first mathematics course at Wayne State University (WSU) must place into the course according to the policies of the WSU Department of Mathematics. Your placement into one of these courses will be based on your America College Test (ACT) Score. Please check with an academic advisor.

Any student who does not place into an MAT course using an ACT Math score as described above must take the WSU Mathematics Placement Examination to determine MAT course placement.

Math Competency

All educated individuals must show competency in their mathematical skills. These skills will help you to study other topics in which mathematics is a significant part of the subject matter, to deal with mathematical calculations that you might need to do in your prospective career, to manage your own personal finance, or to gain a better understanding of the mathematics that relate to public issues.

Break-down of the Mathematics Competency Exam

The examination consists of 55 questions. All students are given Part A (25 questions) and Part B (15 questions), but only those students who wish to place into MAT 2010 receive Part C (15 questions). You will be given 120 minutes to complete the exam. And remember there are no calculators allowed during the exam!

The following is a list of concepts by the different parts. This is by no means a complete list of all the concepts you would need to know.

PART A

- Add, subtract, multiply and divide rational numbers (includes integers, fractions, and decimals).
- Use the order of operations correctly to simplify expressions.
- Be familiar with introductory algebra skills, such as distributing and combining like terms.
- Simplify algebraic expressions.
- Be able to use exponent rules. Note that exponents may not be integers. For instance, it is possible to have a rational number or an algebraic expression as an exponent.
- Solve and graph linear equations.
- Solve literal equations for a given variable.
- Know geometry definitions such as the definition for an equilateral triangle and the radius of a circle.
- Solve introductory geometry problems. And be able to solve more complex problems using geometry definitions.

PART B

- Add, subtract, multiply and divide polynomials.
- Solve quadratic and rational equations.
- Solve and graph equations with inequalities.
- Solve and graph equations with an absolute value.
- Simplify radical expressions and solve radical equations.
- Know the definition, notation, and interpretation of functions.
- Understand and be able to solve problems with both rational and inverse functions.
- Understand and be able to solve problems with exponential and logarithmic functions. Also, be able to solve application problems with algebra, such as using logarithms to help determine the loudness of a sound.
- Solve problems with complex numbers.
- Know and be able to apply right triangle relationships, such the Pythagorean Theorem.
- Solve problems that involve parallel and perpendicular lines.

PART C

- Know and be able to use basic trigonometry definitions and identities.
- Use trigonometry to solve problems with triangles, such as finding the length of a side of a triangle using the sine function.
- Know the graphs of trigonometric functions.
- Understand the relationship between trigonometry and circles, including topics such as the unit circle and arc length.
- Be able to solve more complex problems involving parallel and perpendicular lines.

REMEMBER: This is not a complete list of concepts. This is a partial list made from observations of different mathematics competency exams!

Characteristics of a Successful Exam-Taker (students who have passed)

There are five common characteristics that we have noticed from those students who have passed the Mathematics Competency Exam.

1. They are dedicated to the preparation it takes to do well on the exam from the first day they begin their studies.
2. They almost never let a day pass by without working on mathematics, even if it is for 20 minutes here or there.
3. They seek outside help or extra tutoring on a weekly basis.
4. They take multiple practice exams under conditions that are similar to the actual test.
5. They allow themselves at least six weeks to prepare for the exam.

Notice that not one of these characteristics assumes someone is naturally good at math. In fact, that is a big myth! Those you may view as "math people" just have a stronger math background than you. None of us were born being able to solve algebraic story problems or graph linear inequalities. Those are skills we acquire over time when we make an honest effort to learn them.

Do you want to know the secret to being a good math student? The answer is **HARD WORK** and **PERSISTENCE**. Don't give up! It might take you longer than other people, but you will eventually get it. Practice until you master a concept. Once you have it down cold, do it one more time. Only take the exam when you can honestly tell yourself that you've put in the time and effort.

Purpose of This Study Guide

The purpose of this study guide is to brush up on some of the topics that will help you improve your score on the mathematics competency exam. This study guide does not cover most of the material you will encounter on Part B and Part C of the exam. It is not a magic wand. **Reading through this study guide and neglecting to work the practice problems thoroughly will not enable you to do well on the competency exam.** You will have to work through certain sections more than once and work and re-work many of the practice problems multiple times.

This study guide is not intended to provide you with a comprehensive review of algebra. It will not make you a wizard in algebra. Do not think this is the end-all, be-all of mathematics. It is not even close. We are just scratching the surface of the math topics.

Lastly, there is usually more than one method that can be used to solve math problems. When you see a problem done in this study guide, it is because that was the way I know how to do it. If you already know a different way that you prefer to handling a certain problem, use it. All that matters to pass the competency exam is you end up with the same answer.