# Algebra Readiness Test Syllabus

Placement out of the Math Preparatory modules and into Ma 103, 180, 220, or BA/Ma 320 requires a satisfactory understanding of the following topics:

**Set Theory**

**Order of Operations**

**Polynomial Expressions**

- Simplify
- Perform the four operations
- Factor – be sure you recognize and can factor
    - Perfect square trinomials
    - Difference of squares
    - Sum and difference of cubes
    - Polynomials that can be factored by grouping

**Rational Expressions**

- Simplify (with positive and negative integer exponents)
- Simplify complex rational expressions
- Perform the four operations

**Radical Expressions**

- Simplify
- Convert from radical to rational exponent form
- Perform the four operations

**Complex Numbers**

- Perform the four operations
- Simplify powers of $i$

**Algebra: solve for $x$**

*Remember, in all cases a simplified expression has*

- Fractions completely reduced
- No perfect squares under a square root (or perfect cubes under a $\sqrt[3]{\ }$, etc.)
- No negative exponents
- No radicals (or fraction exponents or $i$s, which are also radicals) in the denominator
- Polynomials have all like terms combined

# Ma 103/105 Placement Test Syllabus

Placement into Ma 105 requires a satisfactory understanding of the following topics:

**Polynomial Expressions**

- Simplify
- Perform the four operations
- Factor

**Rational Expressions**

- Simplify (with positive and negative integer exponents)
- Simplify complex rational expressions
- Perform the four operations

**Radical Expressions**

- Simplify
- Convert from radical to rational exponent form
- Perform the four operations

**Complex Numbers**

- Perform the four operations
- Simplify powers of $i$

**Solve equations and inequalities of the following type**

- Linear
- Absolute value
- Quadratic
- Rational
- Radical

**Functions**

- Linear in two variables: graph, slope, intercepts, write equation
- Quadratic: graph, vertex, intercepts, opens up or down, maximum or minimum value
- Polynomial of degree > 2: graph, possible rational zeros, number of positive and negative real zeros, end-tail behavior
- Rational: graph, domain, intercepts, asymptotes

**Conics**

- Circle: graph, center, radius
- Parabola: graph, vertex, focus, directrix
- Ellipse: graph, center, vertices, foci
- Hyperbola: graph, center, vertices, foci, asymptotes

Chapters P, 1-3, 8 of the following text address the topics covered by this syllabus:

*College Algebra and Trigonometry*, Aufmann, Barker, Nation, 7th edition
ISBN: 978-1-4390-4860-3

# Ma 105/200 Placement Test Syllabus

Placement into Ma 200 requires a satisfactory understanding of the following topics:

**Inverses**

- Find inverse function of given function
- Graphs of inverse functions
- Composition of Inverse Functions
- Logarithmic properties
- Exponential and Logarithmic equations

**Trigonometry**

- Right triangle trigonometry
- Arc Length Formula
- Linear speed and Angular speed relationship
- Solve a triangle. Given parts of a triangle, find the other parts. There may be more than one answer.
- Angle of elevation /depression
- Trigonometric functions of any angle
- Graphs of trigonometric functions
- Relation of trigonometric values to the unit circle

**Trig Computations**

- Given a trig value $f(\alpha) = z$ and either a quadrant or the sign of another trig value, find another trig value $g(\alpha)$
- Compute a (known) trig value. Need to know multiples of $\pi/6$ and $\pi/4$
- Solve a trigonometric equation
- Given a point on the terminal side of an angle, find the sine and cosine of that angle
- Logarithms and Exponentials: Convert an equation involving logs and exponentials
- Convert between degrees and radians

**Identities**

- Verify trig identities
- Trig Functions and Their Inverses: $\sin(\sin^{-1} x)$ = ?; $\sin^{-1}(\sin x)$ = ?; $\log_a(a^x)$ = ?
- Pythagorean Identities
- Double Angle and Function Squared: $\sin(2x)$, $\cos(2x)$, $\tan(2x)$
- Law of Sines and Law of Cosines

**Vectors**

- Vector basics
- How far apart are two items?

**Complex Numbers**

- Raise a complex number to a power or find its roots
- Convert between rectangular and polar form of a complex number

**Sequences and Series**

- Find the sum of a series.
- Convert a series into its sigma form
- Find a recursive definition for a sequence
- Find the $n^{th}$ term definition for a sequence

Chapters 4-7, 11 of the following text address the topics covered by this syllabus:

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