

## **OFFICIAL SYLLABUS**

### **MATH 120 – College Algebra**

(Adopted – Fall 2025; Committee: Z. Agustin, G. Nagel, M. Price)

Textbook: *College Algebra with Corequisite Support*, by Miller and Gerken; ALEKS

- 1.2 – Linear Equations: Review solving equations by clearing fractions
- 3.4 – Review of factoring methods & solving by factoring; Applications: Word problems involving geometry – rectangles and area and Word problems using Pythagorean Theorem
- 3.5 – Solving Equations Using the Square Root Property and Completing the Square
- 3.6 – Solving Quadratic Equations Using the Quadratic Formula: Solve using the quadratic formula, including clearing fractions first, Solve literal equations requiring use of the square root to solve (not quadratic formula), and Application: Word problems involving motion of an object launched into the air
- 4.3 – Rational Equations: Solve rational equations and literal rational equations for a specified variable
- 4.4/**1.3 Part 2** – Applications of Rational Equations: Uniform Motion word problems (1.3 and 4.4) and Word problems involving two people working together (may need to review cross multiplying)
- 4.5 – Rational Exponents: Simplify expressions of the form  $a^{1/n}$  and  $a^{1/n}$ , Convert between rational exponents and radical notation, Simplify algebraic expressions with rational exponents, and Factor expressions with rational exponents
- 4.6 – Radical Equations & Equations with Rational Exponents: Solve equations containing one radical, two square roots, and rational exponents.
- 4.7 – Equations in Quadratic Form: solve using substitution
- 5.2 – Circles: Write the equation of a circle in standard form, Identify the radius and center of a circle from its equation and graph the circle, and Complete the square to write the equation in standard form
- 5.3 – Functions & Relations: Determine if a relation is a function, Evaluate using function notation, Determine the domain of a given equation, Estimate function values from a graph, Determine domain and range given a graph, and Find x and y intercepts of a function (Review absolute value equations and inequalities)
- 6.1 – Transformation of Graphs: Graph and recognize parent functions and Translation, stretches & shrinks, reflections
- 6.2 – Symmetry & Piecewise Functions: Identify even and odd functions graphically, and by looking at  $f(-x)$ , Graph piecewise functions, and Evaluate piecewise functions
- 6.3 – Average Rate of Change, Difference Quotient, Function Behavior: Compute average rate of change, Identify intervals on a graph where a function is increasing, decreasing, constant, Identify relative minima and maxima of a function from its graph, and Evaluate the difference quotient (linear, quadratic, and of the form  $1/(x+a)$  only)
- 6.4 – Algebra of Functions and Function Composition: Combine functions using basic operations, Compose and decompose functions, and Determine domain of a composed function

9.1 – Inverse Functions: Determine whether a function is 1-1, Verify whether two functions are inverses by finding their compositions, Find the equation of an inverse function, and Given a graph, graph the inverse function by switching x and y coordinates of points

7.1 – Quadratic Functions & Applications: Graph a quadratic equation written in vertex form, Identify vertex, Find x and y intercepts, Complete the square to write a quadratic equation in vertex form, and Determine the min/max, intervals of increasing/decreasing, domain and range

7.2 – Intro to Polynomial Functions: End Behavior, Factor to find zeros of a polynomial, Zeros and multiplicity, Sketch a polynomial function, Intermediate Value Theorem

7.3 – Division of Polynomials, Remainder and Factor Theorems: Divide polynomials using long division, Divide polynomials using synthetic division, Use Remainder Theorem to evaluate a polynomial, Use synthetic division to determine if given polynomials are factors, Factor a polynomial given 1 zero, and Build a polynomial given its zeros

7.4 – Zeros of Polynomials: List possible rational zeros using Rational Roots Theorem, Use Rational Roots Theorem and synthetic division to factor polynomials and find zeros, Apply the fundamental theorem of algebra, and Build a general polynomial given its zeros

7.5 – Polynomial Inequalities: Solve inequalities given a polynomial graph, Graph a polynomial to solve an inequality, and Solving using sign chart

8.1/8.2 – Rational Functions: Identify vertical asymptotes, Find horizontal asymptotes, Find the equation of a slant asymptote, Find x and y intercepts, and Graph rational functions involving horizontal and vertical asymptotes (not slant)

10.1 – Graphs of Linear Systems in Two Variables – solve by graphing (review graphing lines using slope and y-intercept and writing equations of lines)

10.2/1.3 – Systems of Linear Equations in Two Variables: Solve using substitution or elimination (addition method), Identify systems that have no solution or infinite solutions, and Applications: Word problems that involve writing two linear equations with 2 variables and mixture word problems are covered here

11.3 – Operations on Matrices: Add and subtract matrices, Multiply by a scalar, and Solve an equation containing matrices

11.5 – Determinants and Cramer's Rule (2x2 only)

Any instructor should cover all of the material specified.