

Learning Outcomes - UNR Math 126

Summary of Math 126 Learning Outcomes

1. **Fundamental concepts in Algebra**

Students are able to recognize real numbers and use their properties. They perform operations on algebraic expressions and simplify algebraic expressions involving exponents and radicals.

2. **Equations and Inequalities**

Students solve linear, quadratic and other types of equations. They also solve linear, quadratic, polynomial, rational and absolute value inequalities.

3. **Functions and Graphs**

Students understand the concepts and are able to identify the domain, the range, intercept, zero and asymptote. They are able to perform basic operations on functions: addition, subtraction, multiplication, division and composition. They define and determine the inverse of a function. Students recognize and graph linear, quadratic and absolute value functions. They describe symmetries of graphs.

4. **Polynomial functions**

Students know and are able to use the Division algorithm for polynomials, the Remainder Theorem and factor Theorem. They use long division and syntetic division to find a quotient and remainder and the zeros of a polynomial. They sketch the graph of polynomial function of degree greater than two and of rational functions.

5. **Exponential and Logarithmic functions**

Students recognize and define exponential and logarithmic functions. They sketch and analyze graphs of exponetial and logarithmic functions. They solve word problems involving exponential and logarithmic functions, including problems about compounding interest, exponential growth and decay.

6. **Systems of equations**

Students solve systems of two and three variables by substituions and Gaussian elimination. They are able to use systems to solve word problems. They perform basic operations like addition, subtraction and multiplication on matrices, and are able to determine the inverse of a square matrix.

Upon successful completion of Math 126, a student should be able to:

1. Fundamental concepts in Algebra

- (a) Understand the relationships of different number systems.
- (b) Recognize and use properties of real numbers.
- (c) Use the definition of absolute value.
- (d) Simplify algebraic, exponential and radical expressions.
- (e) Understand and use the terminology associated with the rectangular coordinate system.
- (f) Use the distance and the midpoint formulas.
- (g) Define and find the symmetries on a graph.
- (h) Identify and use the equations of lines.
- (i) Identify and use the slope of a line.
- (j) Identify the center and radius, and sketch the graph of a circle given by an equation in standard or general form.

2. Equations and Inequalities

- (a) Solve linear equations.
- (b) Understand and use interval notation to express solutions of inequalities.
- (c) Solve linear inequalities.
- (d) Graph linear equations.
- (e) Recognize and solve quadratic equations using the quadratic formula.
- (f) Understand and use the Zero Factor Theorem.
- (g) Solve absolute value and rational equations.
- (h) Solve absolute value and rational inequalities.

3. Functions and Graphs

- (a) Evaluate expressions using function notation.
- (b) Represent functions using formulas, tables and graphs.
- (c) Identify functions from algebraic, graphical, tabular and verbal representations.
- (d) Use function notation when evaluating functions and sketching graphs of functions.
- (e) Identify the domain and range of functions.
- (f) Graph a piece-wise defined function.
- (g) Identify properties of graphs such as relative and global extrema, symmetry, increasing, decreasing, even, and odd.
- (h) Translate between the graph and the equation of a function.
- (i) Perform operations on functions, including composition of functions.
- (j) Identify one-to-one functions.
- (k) Identify and graph the inverse of a function. Find the inverse of a given function.

4. Polynomial functions

- (a) Analyze and graph quadratic functions. Determine their vertex and intercepts.
- (b) Find the equations of quadratic functions from given data.
- (c) Set up and solve quadratic applications, including maximum/minimum problems.
- (d) Analyze and graph polynomial functions of degree greater than 2.
- (e) Perform basic operations on polynomials.
- (f) Use the division algorithm for two polynomials.
- (g) Apply the Remainder Theorem and Factor Theorem for polynomials.
- (h) Find real zeros of polynomials.
- (i) Graph rational functions.

5. Exponential and Logarithmic functions

- (a) Analyze and graph exponential and logarithmic functions.
- (b) Convert from logarithmic form to exponential form; and from exponential form to logarithmic form.
- (c) Solve exponential and logarithmic equations.
- (d) Set up and solve problems involving exponential growth and decay.
- (e) Understand and use the compound interest formula.

6. Systems of equations

- (a) Solve non-linear systems of equations using the substitution.
- (b) Solve systems of linear equations
- (c) Set up and solve application problems using a system of equations.
- (d) Perform basic operations on matrices
- (e) Identify the inverse of a 2×2 or 3×3 matrix
- (f) Evaluate 2×2 and 3×3 determinants
- (g) Use Cramer's rule to solve a system of linear equations

7. Solve application problems and interpret, and draw inferences from, the results.