

College Algebra

All institutions generally expect students should be able to:

- 1) Understand the concepts of functions and be able to apply the properties of functions and their graphs.
- 2) Understand the relationship between linear functions and straight lines and be able to apply such knowledge.
- 3) Understand the concept of piecewise-defined functions and be able to translate this knowledge to their properties and graphs.
- 4) Understand the concept of transformation (e.g., shifting, reflecting, stretching, shrinking) of functions and be able to recognize and apply such knowledge when graphing functions.
- 5) Understand the concept of combining functions and be able to perform these operations and recognize the resulted functions and their properties.
- 6) Understand the invertibility of functions and the relationship between functions inverse to each other, and be able to determine inverse functions when appropriate.
- 7) Understand the meaning of solutions to linear and rational equations and be able to solve such equations whenever appropriate.
- 8) Apply the acquired understanding and knowledge of functions to model appropriate real-world situations and draw mathematical conclusions.
- 9) Understand the concept of complex numbers and be able to perform operations involving them.
- 10) Understand the meaning of solutions to quadratics equations and be able to solve such equations.
- 11) Understand and recognize other types of equations and be able to apply previously acquired knowledge to solve such equations whenever appropriate.
- 12) Understand the meaning of solutions to linear and absolute value inequalities and be able to solve such inequalities whenever appropriate.
- 13) Understand the relationship between quadratic functions and parabolas, and able to connect such knowledge to quadratics equations.
- 14) Understand the properties and graphs of polynomial functions and be able to perform basic operations involving polynomials.
- 15) Understand the meaning of the Remainder Theorem and its application to evaluating polynomial functions. Understand the meaning of the Factor Theorem and its application to solving polynomial equations.
- 16) Understand the meaning of zeros of polynomial functions and their connection to the graphs of these functions.
- 17) Understand the importance of the Fundamental Theorem of Algebra, its application to polynomial equations, and its connection to complex numbers.
- 18) Understand the properties and graphs of rational functions and be able to generate appropriate information, including asymptotes.
- 19) Understand the meaning of solutions to polynomial and rational inequalities and be able to solve such inequalities whenever appropriate.
- 20) Understand the properties and graphs of exponential functions and be able to evaluate and graph such functions.

- 21) Understand the relationship between logarithmic functions and exponential functions and be able to evaluate and graph such functions.
- 22) Understand the properties of logarithms and their relationship to exponentials. Be able to perform operations on logarithms.
- 23) Understand the meaning of solutions to exponential and logarithmic equations and be able to apply the inverse relationship between exponentials and logarithms to equations involving them whenever appropriate.
- 24) Understand the meaning of exponential growth and decay and apply the knowledge of exponential and logarithmic functions model two applications.
- 25) Understand the meaning of compound interest and apply the knowledge of exponential functions to model this application.

The following competencies are based on the elective topics and vary from institution to institution. Students should be able to:

- 1) Understand the underlining principle of variation and how it is used to model many applications.
 - 2) Understand the meaning of solutions to linear systems of equations and be able to use effective ways to find and express possible solutions.
 - 3) Understand the meaning of solutions to systems of nonlinear equations and be able to use effective ways to find and express possible solutions.
 - 4) Understand the concepts of matrices and their inverses (if exist), matrix operations, determinants, and be able to perform required computations. Understand how matrices are used to model and solve system of linear equations and be able to perform required appropriate computations.
 - 5) Understand the properties and graphs of parabolas, ellipses, and/or hyperbolas and be able to perform basic related algebraic/graphing operations.
- Understand the concepts of sequences and series (including the arithmetic and geometric cases) and their applications. Be able to perform basic related algebraic tasks.