

## WTCS Repository

10-804-195 College Algebra w Apps

# Course Outcome Summary

### Course Information

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|  | Alternate Title | College Algebra with Applications |
|  | Description | This course covers  skills needed for success in Calculus and many application areas at the baccalaureate level. Topics include the real and complex number systems, polynomials, exponents, radicals, solving equations and inequalities, relations and functions, systems of equations and inequalities, matrices, graphing, conic sections,and the binomial theorem. |
|  | Total Credits | 3 |
|  | Total Hours | 54 |

Pre/Corequisites

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| Prerequisite | Each Wisconsin Technical College determines the General Education course prerequisites used by their academic institution. If prerequisites for a course are determined to be appropriate, the final Course Outcome Summary must identify the prerequisites approved for use by the individual Technical College. |

### Course Competencies

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| 1. | Analyze the features of a graph of a given function or relation |
|  | Assessment Strategies |
|  | 1.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | You will know you are successful when you: |
|  | 1.1. | graph a relation or function in x and y |
|  | 1.2. | differentiate between symmetry about the x-axis, the y-axis, and the origin |
|  | 1.3. | determine the domain and range of a relation or function |
|  | 1.4. | define a 1-1 function |
|  | 1.5. | apply the horizontal line test for 1-1 |
|  | 1.6. | determine the inverse function of a 1-1 function |
|  | 1.7. | specify the relation between the domain and the range of a function and its inverse |
|  | 1.8. | apply basic transformation to the elementary functions  |
|  | 1.9. | differentiate among elementary functions |
| 2. | Solve linear and quadratic equations and inequalities |
|  | Assessment Strategies |
|  | 2.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | You will know you are successful when you: |
|  | 2.1. | relate the solution of an equation to the x-intercept of a graph of the function and to the root (or zero) of the function |
|  | 2.2. | solve linear equations and inequalities |
|  | 2.3. | use appropriate notations when writing solutions of inequalities |
|  | 2.4. | solve quadratic equations using more than one method |
|  | 2.5. | use modeling techniques to solve applied problems |
|  | 2.6. | use appropriate notations when writing solutions of inequalities |
|  | 2.7. | use modeling techniques to solve applied problems |
| 3. | Analyze the properties of linear and quadratic functions |
|  | Assessment Strategies |
|  | 3.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | You will know you are successful when you: |
|  | 3.1. | graph quadratic functions |
|  | 3.2. | apply multiple transformations to quadratic functions |
|  | 3.3. | determine the composition of two functions |
|  | 3.4. | create new functions by using function operations |
|  | 3.5. | note when function composition is non-commutative |
|  | 3.6. | apply geometric transformations as compositions |
|  | 3.7. | determine the characteristics of a quadratic function |
|  | 3.8. | find zeros of quadratic functions algebraically and graphically |
|  | 3.9. | convert between standard and graphing form of a quadratic function |
| 4. | Analyze polynomials |
|  | Assessment Strategies |
|  | 4.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | You will know you are successful when you: |
|  | 4.1. | find zeros of polynomial functions |
|  | 4.2. | determine whether a function is increasing or decreasing on an interval. |
|  | 4.3. | determine the behavior of a polynomial function at the end points of its domain. |
|  | 4.4. | use graphical methods to estimate the roots of a polynomial equation. |
|  | 4.5. | identify local and global extrema |
|  | 4.6. | apply the intermediate value theorem |
|  | 4.7. | use the fundamental theorem of algebra to determine the number of roots of a polynomial equation. |
|  | 4.8. | use the fundamental theorem of algebra to determine the number of roots of a polynomial function |
|  | 4.9. | identify the degree of a polynomial function |
|  | 4.10. | determine all solutions to polynomial equations including complex numbers |
| 5. | Analyze rational functions |
|  | Assessment Strategies |
|  | 5.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | You will know you are successful when you: |
|  | 5.1. | simplify complex fractions |
|  | 5.2. | identify removable discontinuities |
|  | 5.3. | graph rational functions |
|  | 5.4. | perform arithmetic operations with rational expressions |
|  | 5.5. | determine the domain of rational functions |
|  | 5.6. | determine all asymptotes  |
|  | 5.7. | solve rational equations |
| 6. | Analyze radical functions |
|  | Assessment Strategies |
|  | 6.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | You will know you are successful when you: |
|  | 6.1. | solve radical equations |
|  | 6.2. | graph radical functions |
|  | 6.3. | verify solutions to identify extraneous roots |
|  | 6.4. | determine the domain of radical expression |
| 7. | Analyze exponential and logarithmic functions |
|  | Assessment Strategies |
|  | 7.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | You will know you are successful when you: |
|  | 7.1. | define the exponential function with an arbitrary base |
|  | 7.2. | graph an exponential function with an arbitrary base |
|  | 7.3. | model exponential functions to real life applications |
|  | 7.4. | solve exponential equations |
|  | 7.5. | define logarithmic functions with an arbitrary base |
|  | 7.6. | identify the inverse relationship between the logarithmic function and the exponential function |
|  | 7.7. | graph a logarithmic function with an arbitrary base |
|  | 7.8. | solve logarithmic equations |
| 8. | Solve algebraic systems |
|  | Assessment Strategies |
|  | 8.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | You will know you are successful when you: |
|  | 8.1. | solve nonlinear systems of equations |
|  | 8.2. | solve systems of linear equations in three or more variables |
|  | 8.3. | use systems of three equations to solve applied problems |
|  | 8.4. | graph systems of linear inequalities  |
|  | 8.5. | graph systems of nonlinear equations |
| 9. | Analyze conic sections |
|  | Assessment Strategies |
|  | 9.1. | Oral, Written, Graphic and/or Skill Assessment |
|  | Criteria |
|  | You will know you are successful when you: |
|  | 9.1. | identify all conic sections based on a graph |
|  | 9.2. | identify all conic sections based on an equation |
|  | 9.3. | analyze the characteristics of all conic sections  |
|  | 9.4. | sketch the graph of all conic sections given their equations |