MATH-0965: INTERMEDIATE ALGEBRA

Cuyahoga Community College

Viewing: MATH-0965 : Intermediate Algebra

Board of Trustees:
2016-03-31

Academic Term:
Spring 2019

Subject Code
MATH - Mathematics

Course Number:
0965

Title:
Intermediate Algebra

Catalog Description:
Second of two developmental mathematics courses. Topics include factoring, solving equations by factoring, rational expressions, rational equations, systems of three linear equations in three variables, radical expressions, radical equations, expressions with rational exponents, equations with rational exponents, quadratic equations involving the Zero Product Property, Square Root Property, Completing the Square, and the Quadratic Formula, graphing quadratic functions, exponential expressions, and graphing exponential functions. Includes applications and activities to build skills in problem solving.

Credit Hour(s):
6

Lecture Hour(s):
6

Requisites

Prerequisite and Corequisite
MATH-0955 Beginning Algebra, or sufficient score on math placement test; or departmental approval.
MATH-0960 and MATH-0980 taken prior to Fall 2016 will also meet the prerequisite requirement for this course.

Please note: MATH-0965 Intermediate Algebra will NOT count as a college-level course (MATH-1270 or MATH-1280) due to the State of Ohio’s new definition of a credit-bearing math course. Although credit is earned for 0 level courses, the credit does not apply to meet completion requirements of any certificate or degree at Cuyahoga Community College.

I. ACADEMIC CREDIT

Academic Credit According to the Ohio Department of Higher Education, one (1) semester hour of college credit will be awarded for each lecture hour. Students will be expected to work on out-of-class assignments on a regular basis which, over the length of the course, would normally average two hours of out-of-class study for each hour of formal class activity. For laboratory hours, one (1) credit shall be awarded for a minimum of three laboratory hours in a standard week for which little or no out-of-class study is required since three hours will be in the lab (i.e. Laboratory 03 hours). Whereas, one (1) credit shall be awarded for a minimum of two laboratory hours in a standard week, if supplemented by out-of-class assignments which would normally average one hour of out-of-class study preparing for or following up the laboratory experience (i.e. Laboratory 02 hours). Credit is also awarded for other hours such as directed practice, practicum, cooperative work experience, and field experience. The number of hours required to receive credit is listed under Other Hours on the syllabus. The number of credit hours for lecture, lab and other hours are listed at the beginning of the syllabus. Make sure you can prioritize your time accordingly. Proper planning, prioritization and dedication will enhance your success in this course.

The standard expectation for an online course is that you will spend 3 hours per week for each credit hour.

II. ACCESSIBILITY STATEMENT

If you need any special course adaptations or accommodations because of a documented disability, please notify your instructor within a reasonable length of time, preferably the first week of the term with formal notice of that need (i.e. an official letter from the Student Accessibility Services (SAS) office). Accommodations will not be made retroactively.
III. ATTENDANCE TRACKING

Regular class attendance is expected. Tri-C is required by law to verify the enrollment of students who participate in federal Title IV student aid programs and/or who receive educational benefits through other funding sources. Eligibility for federal student financial aid is based in part on enrollment status.

Students who do not attend classes for the entire term are required to withdraw from the course(s). Additionally, students who withdraw from a course or stop attending class without officially withdrawing may be required to return all or a portion of their financial aid based on the date of last attendance. Students who do not attend the full session are responsible for withdrawing from the course(s).

Tri-C is responsible for identifying students who have not attended a course before financial aid funds can be applied to students’ accounts.

Therefore, attendance is recorded in the following ways:

• For in-person and blended-learning courses, students are required to attend the course by the 15th day of the semester (or equivalent for terms shorter than five weeks) to be considered attending. Students who have not met all attendance requirements for in-person and blended courses, as described herein, within the first two weeks or equivalent, will be considered not attending.

• For online courses, students are required to login at least two times per week and submit one assignment per week for the first two weeks of the semester, or equivalent to the 15th day of the term. Students who have not met all attendance requirements for online courses, as described herein, within the first two weeks or equivalent, will be considered not attending.

At the conclusion of the first two weeks of a semester or equivalent, instructors report any registered students who have "Never Attended" a course. Those students will be administratively withdrawn from that course. However, after the time period in the previous paragraphs, if a student stops attending a class or wants or needs to withdraw, for any reason, it is the student’s responsibility to take action to withdraw from the course. Students must complete and submit the appropriate Tri-C form by the established withdrawal deadline.

Tri-C is required to ensure that students receive financial aid only for courses that they attend and complete. Students reported for not attending at least one of their registered courses will have all financial aid funds held until confirmation of attendance in registered courses has been verified. Students who fail to complete at least one course may be required to repay all or a portion of their federal financial aid funds and may be ineligible to receive future federal financial aid awards. Students who withdraw from classes prior to completing more than 60 percent of their enrolled class time may be subject to the required federal refund policy.

If illness or emergency should necessitate a brief absence from class, students should confer with instructors upon their return. Students having problems with coursework due to a prolonged absence should confer with the instructor or a counselor.

IV. LEARNING OUTCOMES ASSESSMENT

Occasionally, in addition to submitting assignments to their instructors for evaluation and a grade, students will also be asked to submit completed assignments, called ‘artifacts,’ for assessment of course and program outcomes and the College’s Essential Learning Outcomes (ELOs). The artifacts will be submitted in Blackboard or a similar technology. The level of mastery of the outcome demonstrated by the artifact DOES NOT affect the student’s grade or academic record in any way. However, some instructors require that students submit their artifact before receiving their final grade. Some artifacts will be randomly selected for assessment, which will help determine improvements and support needed to further student success. If you have any questions, please feel free to speak with your instructor or contact the Learning Outcomes Assessment office.

V. CONCEALED CARRY STATEMENT

College policy prohibits the possession of weapons on college property by students, faculty and staff, unless specifically approved in advance as a job-related requirement (i.e., Tri-C campus police officers) or, in accordance with Ohio law, secured in a parked vehicle in a designated parking area only by an individual in possession of a valid concealed carry permit.

As a Tri-C student, your behavior on campus must comply with the student code of conduct which is available on page 29 within the Tri-C student handbook, available athttp://www.tri-c.edu/student-resources/documents/studenthandbook.pdf. You must also comply with the College’s Zero Tolerance for Violence on College Property available athttp://www.tri-c.edu/policies-and-procedures/documents/3354-1-20-10-zero-tolerance-for-violence-policy.pdf

Outcomes
Course Outcome(s):
Factor Polynomials and Solve Equations by Factoring.
Objective(s):
1. Identify and write polynomials in standard form.
2. Factor the difference of two perfect cubes.
3. Factor four termed polynomials involving a difference of squares and then, a GCF.
4. Factor a four termed polynomial that involves a sum or difference of cubes and then, a GCF.
5. Factor a four termed polynomial that involves a trinomial that factors as a binomial sum or difference squared, such that the expression composed of this factorization and the term not involved in the trinomial factors as a difference of squares.
6. Identify prime polynomials.
7. Analyze the factoring process to factor any two, three or four termed polynomial expression.
8. Solve polynomial equations by factoring.
9. Solve application problems involving factoring polynomials.
10. Factor the Greatest Common Factor (GCF) from polynomials.
11. Factor four termed polynomials using the method of GCF.
12. Factor trinomials that result in a binomial sum, squared.
13. Factor trinomials that result in a binomial difference, squared.
14. Factor the difference of two perfect squares.
15. Factor trinomials with a leading coefficient of one.
16. Factor trinomials with leading coefficients not equal to one.
17. Factor the sum of two perfect cubes.

Course Outcome(s):
Simplify Rational Expressions and Solve Rational Equations.

Objective(s):
1. Define and identify rational expressions and functions.
2. Determine the domain and range of rational functions.
3. Evaluate rational expressions and functions at given numerical values.
4. Simplify or reduce rational expressions into lowest terms.
5. Determine the Least Common Denominator (LCD) for rational expressions.
6. Rewrite rational expressions as equivalent rational expressions using the LCD.
7. Add and subtract rational expressions.
8. Multiply and divide rational expressions.
9. Define and simplify complex rational expressions.
10. Solve equations involving rational expressions and functions.
11. Solve applications involving rational equations and functions.

Course Outcome(s):
Solve Systems of Linear Equations in Three Variables.

Objective(s):
1. Verify solutions of systems of linear equations in three variables.
2. Identify consistent, inconsistent, and dependent systems in three variables and write the solutions for each type.
3. Identify the general graphic solutions to linear equations in three variables as a point, infinite solutions, and no solution in a three-dimensional space.
4. Solve systems of equations in three variables using the Method of Substitution.
5. Solve systems of equations in three variables using the Method of Elimination.
6. Use systems of equations in three variables to solve application problems using the Method of Elimination or the Method of Substitution.

Course Outcome(s):
Graph Radical Expressions, Simplify Radical Expressions, Simplify Expressions Containing Rational Exponents, and Solve Radical Equations and Equations with Rational Exponents.

Objective(s):
1. Define and identify square roots, cube roots, nth roots, principal roots, conjugates, and undefined real roots.
2. Evaluate radical expressions involving any index n, n greater than or equal to two.
3. Use a calculator to approximate irrational radical values.
4. Determine the domain and range of radical functions.
5. Graph radical functions.
6. Simplify radical expressions involving the nth root of a to the nth power, where a is any real number and n is an even or odd natural number greater than or equal to two.
7. Define and apply the properties of addition and subtraction of radicals to simplify radical expressions.
8. Define and apply the Product Rule for Radicals to simplify products of radicals.
9. Define and apply the Distributive Property and the Product Rule for Radicals to multiply radical expressions with more than one term.
10. Use the Product Rule for Radicals and the special product rules for binomials to expand binomial squares or the product of conjugates with radical terms.
11. Rationalize denominators containing one radical term of any index \( n \), \( n \) greater than or equal to two.
12. Rationalize denominators containing two terms with one or two square roots in the terms.
13. Solve radical equations with one root, with the index greater than or equal to two.
14. Solve radical equations with two square roots.
17. Write an expression involving a rational exponent as a radical.
18. Write an expression involving a radical using a rational exponent.
19. Use rational exponents to simplify an expression containing a root of a root.
20. Use rational exponents to reduce the index of a root.
21. Use rational exponents to multiply and divide radical expressions with different indices.
22. Solve equations containing rational exponents.
23. Identify radical equations and equations containing rational exponents that have no solutions or extraneous solutions.
24. Solve application problems involving radical expressions or equations or expressions or equations with rational exponents.

Course Outcome(s):
Solve Quadratic Equations and Graph Quadratic Functions.

Objective(s):
1. Define quadratic equations and functions.
2. Define "i" as equal to the square root of negative one.
3. Define "a + bi" as the standard form of a complex number.
4. Use the Zero Product Property to solve quadratic equations.
5. Use the Square Root Property to solve quadratic equations.
6. Use the Method of Completing the Square to solve quadratic equations.
7. Use the Quadratic Formula to solve quadratic equations.
8. Analyze quadratic equations to determine the optimal method to solve quadratic equations.
9. Use the discriminant to determine the number and types of solutions to quadratic equations.
10. Determine if a quadratic equation has rational solutions and use the solutions to factor the corresponding quadratic expression.
11. Write quadratic equations from given solutions.
12. Define and determine the vertex of a quadratic function using \( x = -b/(2a) \).
13. Determine the maximum or minimum of quadratic functions using the vertex.
14. Determine the domain and range of a quadratic function.
15. Graph quadratic functions that are written in standard form.
16. Solve equations that are quadratic in form.
17. Determine solutions to polynomial equations as an extension of quadratics.
18. Solve quadratic applications and equations including polynomial equations as an extension of quadratics.

Course Outcome(s):
Define and Evaluate Exponential Expressions and Graph Exponential Functions.

Objective(s):
1. Define exponential expressions and functions including base 10 and \( e \).
2. Determine the domain and range of exponential functions.
3. Differentiate between increasing and decreasing exponential functions.
4. Graph exponential functions.
5. Compare, contrast, and differentiate linear, quadratic, and exponential functions.
6. Solve applications involving exponential growth and decay functions given domain values.

Methods of Evaluation:
A. Exams
B. Quizzes
C. Homework
D. Projects
E. In class collaborative work
F. Comprehensive final exam
G. Online coursework
H. Class participation

Course Content Outline:

1. Factor polynomials and solve equations
   a. Polynomials in standard form
   b. Greatest Common Factor (GCF)
   c. GCF method for four-termed polynomials
   d. Binomial sums, squared
   e. Binomial differences, squared
   f. Difference of two perfect squares
   g. Trinomials with leading coefficients of 1
   h. Trinomials with leading coefficients not equal to 1
      i. Sum of two cubes
      j. Difference of two cubes
   k. Four terms involving a difference of squares then, GCF
   l. Four terms involving a sum or difference of two cubes then, GCF
   m. Four termed expression with trinomial that factors as binomial square then, a term forming difference of squares
   n. Prime polynomials
   o. Analytical process to factor any two, three, or four termed expression
   p. Solve polynomial equations by factoring
   q. Application problems

2. Rational expressions and equations
   a. Define rational expressions
   b. Domain and range of rational expressions
   c. Evaluate rational expressions
   d. Simplify rational expressions
   e. Least Common Denominator (LCD) of rational expressions
   f. Rewrite rational expressions with LCD
   g. Add and subtract rational expressions
   h. Multiply and divide rational expressions
      i. Complex rational expressions
      j. Solve equations
   k. Application problems

3. Systems of linear equations in three variables
   a. Verify solutions
   b. Consistent, inconsistent, and dependent systems
   c. Visualize solutions in three-dimensional space
   d. Method of Substitution
   e. Method of Elimination
   f. Application problems

4. Radical and rational exponent expressions and equations
   a. Multiple root types
   b. Evaluate radical expressions
   c. Calculator approximation of roots
   d. Domain and range
   e. Graph
      f. Simplify nth root of \( a^n \)
   g. Properties of addition and subtraction
   h. Product Rule for Radicals
      i. Products of expressions with multiple terms
      j. Special product rules with radicals
   k. Rationalize one term denominators
   l. Rationalize two term denominators
   m. Solve one root radical equations
   n. Solve two root radical equations
   o. Products, quotients, sums, differences with rational exponents
   p. Define roots with rational exponents
   q. Radicals to rational exponents
r. Rational exponents to radicals
s. Root of a root to rational exponents
t. Reduce index
u. Product and quotient of different indices and rational exponents
v. Equations with rational exponents
w. Equations with no solutions or infinite solutions
x. Application problems

5. Quadratic equations and graphs
a. Define quadratic equations and functions
b. Zero Product Property
c. Definition of "I"
d. Definition of complex number
e. Square Root Property
f. Method of Completing the Square
g. Quadratic Formula
h. Analyze to apply optimal method
i. Discriminant
j. Rational solutions and factorable quadratics
k. Solutions to quadratic equations
l. Vertex
m. Minimum and maximums
n. Range and domain
o. Graph quadratic functions
p. Equations in quadratic form
q. Solve polynomials as extension of quadratics
r. Application problems

6. Exponential functions
a. Define exponentials
b. Domain and range
c. Increasing and decreasing
d. Graph
e. Differentiate linear, quadratic, and exponentials
f. Application problems given domain values

Resources


Resources Other
1. Software provided through publisher corresponding to textbook
2. Software and E-book

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