

MATH 374: BEGINNING ALGEBRA - NONCREDIT

Originator

mflora

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Justification / Rationale

We want to add a non-credit option for students who would like to learn beginning algebra.

Effective Term

Spring 2023

Credit Status

Noncredit

Subject

MATH - Mathematics

Course Number

374

Full Course Title

Beginning Algebra - Noncredit

Short Title

BEGINNING ALGEBRA NC

Discipline**Disciplines List**

Mathematics

Modality

Face-to-Face

100% Online

Hybrid

Catalog Description

This is a noncredit course on beginning algebra that focuses on the real number system and the use of algebraic expressions, equations, and inequalities in problem solving. Topics include properties of the real numbers; square roots; arithmetic of algebraic expressions including polynomials and polynomial fractions (rational expressions); solving linear equations and inequalities in one variable; factoring polynomials; the Cartesian coordinate system; and equations and graphs of linear equations in two variables. The proper use of math notation and precise language is emphasized. Applications problems will include those using basic geometric formulas, the Pythagorean Theorem, and various phenomena that can be modeled with algebraic expressions, equations, and/or inequalities.

Schedule Description

This introductory algebra course focuses on the arithmetic of variable expressions and the solving of single variable equations, including basic applications involving these. There is also an introduction to the Cartesian coordinate system and the graphing of linear equations in two variables.

Total Non-Credit Contact Hours

108

Lecture Units

0

Lab Units

0

In-class Hours

108

Out-of-class Hours

0

Total Course Units

0

Total Semester Hours

108

Override Description

noncredit

Required Text and Other Instructional Materials**Resource Type**

Book

Author

Lynn Maracek, MaryAnne Anthony-Smith, Andrea Honeycutt Mathis

Title

Elementary Algebra

Edition

2

City

Houston

Publisher

OpenStax

Year

2020

College Level

No

Flesch-Kincaid Level

9.4

ISBN #

978-1-975076-47-4

Resource Type

Web/Other

Open Educational Resource

Yes

Year

n/a

Description

MyOpenMath is online courseware that may be used with any textbook.

Class Size Maximum

30

Entrance Skills

Perform addition, subtraction, multiplication, and division on rational numbers in both fraction and decimal form.

Requisite Course Objectives

MATH 065-Demonstrate proficiency in basic number facts (addition, subtraction, multiplication, division of integer numbers).

MATH 065-Compute using the four basic operations of addition, subtraction, multiplication, and division on the rational numbers in both fraction and mixed number forms.

MATH 065-Apply the basic operations to solve application problems that involve integer numbers, decimals, mixed numbers and rational numbers.

MATH 372-Demonstrate proficiency in basic number facts (addition, subtraction, multiplication, division of integer numbers).

MATH 372-Compute using the four basic operations of addition, subtraction, multiplication, and division on the rational numbers in both fraction and mixed number forms.

MATH 372-Apply the basic operations to solve application problems that involve integer numbers, decimals, mixed numbers and rational numbers.

Entrance Skills

Find solutions to application problems that involve whole numbers, integers, and rational numbers by applying basic operations.

Requisite Course Objectives

ENG 061-Demonstrate both literal and analytic/interpretive reading skills, and convey these skills in writing.

MATH 065-Apply the basic operations to solve application problems that involve integer numbers, decimals, mixed numbers and rational numbers.

MATH 065-Use concepts and formulas from geometry.

MATH 372-Apply the basic operations to solve application problems that involve integer numbers, decimals, mixed numbers and rational numbers.

MATH 372-Use concepts and formulas from geometry.

Entrance Skills

Simplify expressions with rational numbers and involving several operations by applying the order of operations.

Requisite Course Objectives

MATH 065-Compute using the four basic operations of addition, subtraction, multiplication, and division on the rational numbers in both fraction and mixed number forms.

MATH 065-Apply the order of operations to simplify expressions involving several operations using rational numbers, mixed numbers and decimals.

MATH 372-Compute using the four basic operations of addition, subtraction, multiplication, and division on the rational numbers in both fraction and mixed number forms.

MATH 372-Apply the order of operations to simplify expressions involving several operations using rational numbers, mixed numbers and decimals.

Entrance Skills

Find approximate solutions to problems involving rational numbers using rounding and estimation.

Requisite Course Objectives

MATH 065-Use rounding and estimation to solve problems involving rational numbers, mixed numbers and decimals.

MATH 065-Employ decimal notation and place value to compare, order, and round numbers.

MATH 372-Use rounding and estimation to solve problems involving rational numbers, mixed numbers and decimals.

MATH 372-Employ decimal notation and place value to compare, order, and round numbers.

Entrance Skills

Use decimal notation and place value to compare, order, and round numbers.

Requisite Course Objectives

MATH 065-Use rounding and estimation to solve problems involving rational numbers, mixed numbers and decimals.

MATH 065-Employ decimal notation and place value to compare, order, and round numbers.

MATH 372-Use rounding and estimation to solve problems involving rational numbers, mixed numbers and decimals.
MATH 372-Employ decimal notation and place value to compare, order, and round numbers.

Entrance Skills

Find solutions to proportion problems using the concept of ratio.

Requisite Course Objectives

MATH 065-Use the concept of ratio or rate involving both rational numbers, mixed numbers and decimals to determine the solution to a proportion problem.

MATH 372-Use the concept of ratio or rate involving both rational numbers, mixed numbers and decimals to determine the solution to a proportion problem.

Entrance Skills

Write values as percents, decimals, and fractions and convert any one to another.

Requisite Course Objectives

MATH 065- Apply methods of conversion between percents, decimals, and fractions.

MATH 372-Apply methods of conversion between percents, decimals, and fractions.

Entrance Skills

Solve equations involving percents by applying properties of equality and deductive reasoning.

Requisite Course Objectives

MATH 065- Determine the solution to equations involving percents by deductive reasoning.

MATH 372-Determine the solution to equations involving percents by deductive reasoning.

Entrance Skills

Recognize and convert between units of measurements in the American and metric systems.

Requisite Course Objectives

MATH 065- Recognize and convert between units of measurements in the American and metric systems involving rational numbers, mixed numbers and decimals using conversion factors or proportions.

MATH 372-Recognize and convert between units of measurements in the American and metric systems involving rational numbers, mixed numbers and decimals using conversion factors or proportions.

Entrance Skills

Use unit measure appropriately in applications.

Requisite Course Objectives

ENG 061-Demonstrate both literal and analytic/interpretive reading skills, and convey these skills in writing.

MATH 065- Recognize and convert between units of measurements in the American and metric systems involving rational numbers, mixed numbers and decimals using conversion factors or proportions.

MATH 065-Use unit measure appropriately in applications involving rational numbers, mixed numbers and decimals.

MATH 372-Recognize and convert between units of measurements in the American and metric systems involving rational numbers, mixed numbers and decimals using conversion factors or proportions.

MATH 372-Use unit measure appropriately in applications involving rational numbers, mixed numbers and decimals.

Entrance Skills

Apply geometric concepts and formulas to solve problems involving geometric figures.

Requisite Course Objectives

MATH 065-Use concepts and formulas from geometry.

MATH 372-Use concepts and formulas from geometry.

Entrance Skills

Calculate square roots of perfect square natural numbers, estimate square roots of other positive real numbers, and use the Pythagorean Theorem to find missing side lengths of right triangles.

Requisite Course Objectives

MATH 065-Compute square roots of natural numbers, fractions and decimals; and use the Pythagorean Theorem to solve simple right triangle problems.

MATH 372-Compute square roots of natural numbers, fractions and decimals; and use the Pythagorean Theorem to solve simple right triangle problems.

Entrance Skills

Plot rational numbers on a real number line.

Requisite Course Objectives

MATH 065-Locate integer numbers, rational numbers, mixed numbers and decimals on the real number line.

MATH 372-Locate integer numbers, rational numbers, mixed numbers and decimals on the real number line.

Entrance Skills

Understand the concept of a variable and how a variable can be used to represent an unknown quantity.

Requisite Course Objectives

MATH 065-Understand the concept of a variable and how a variable can be used to represent an unknown quantity.

MATH 372-Understand the concept of a variable and how a variable can be used to represent an unknown quantity.

Entrance Skills

Categorize values as natural numbers, whole numbers, integers, and/or rational numbers.

Requisite Course Objectives

MATH 065- Distinguish between various subsets of the rational numbers including natural numbers, whole numbers, and integers.

MATH 372-Distinguish between various subsets of the rational numbers including natural numbers, whole numbers, and integers.

Entrance Skills

Apply the commutative, associative, distributive, inverse and identity properties to simplify algebraic expressions with rational coefficients and constants.

Requisite Course Objectives

MATH 065-Compute using the four basic operations of addition, subtraction, multiplication, and division on the rational numbers in both fraction and mixed number forms.

MATH 065-Apply the order of operations to simplify expressions involving several operations using rational numbers, mixed numbers and decimals.

MATH 065-Apply the commutative, associative, distributive, inverse and identity properties to simplify algebraic expressions involving fraction, mixed number and decimal coefficients.

MATH 372-Compute using the four basic operations of addition, subtraction, multiplication, and division on the rational numbers in both fraction and mixed number forms.

MATH 372-Apply the order of operations to simplify expressions involving several operations using rational numbers, mixed numbers and decimals.

MATH 372-Apply the commutative, associative, distributive, inverse and identity properties to simplify algebraic expressions involving fraction, mixed number and decimal coefficients.

Entrance Skills

Simplify algebraic expressions involving variables and/or constants raised to natural number exponents.

Requisite Course Objectives

MATH 065-Use the properties of natural number exponents to simplify algebraic expressions.

MATH 372-Use the properties of natural number exponents to simplify algebraic expressions.

Entrance Skills

Verify a rational number is a solution to an equation or show a rational number is not a solution to an equation by evaluating the expressions on both sides of the equation at the given value and checking for equality.

Requisite Course Objectives

MATH 065-Evaluate an algebraic expression via substitution of rational numbers, mixed number and decimals; and determine if a given value is a solution to an algebraic equation.

MATH 372-Evaluate an algebraic expression via substitution of rational numbers, mixed number and decimals; and determine if a given value is a solution to an algebraic equation.

Entrance Skills

Identify and describe terms, factors, variables, and coefficients in algebraic expressions and equations.

Requisite Course Objectives

MATH 065-Explain the concepts of terms, factors, variable and coefficient.

MATH 372-Explain the concepts of term, factor, variable and coefficient.

Course Content

1. Review of the development of the real number system
 - a. integers
 - b. rational
 - c. irrational numbers
2. Review of the properties of real numbers and operations
 - a. commutative properties of addition and multiplication
 - b. associative properties of addition and multiplication
 - c. distributive property
 - d. identity properties of 0 (addition) and 1 (multiplication)
 - e. inverse properties of addition and multiplication
3. The concept of a variable
4. Arithmetic of algebraic expressions
 - a. the application of the commutative, associative, distributive, identity, and inverse properties to simplify expressions
 - b. the application of the order of operations to simplify algebraic expressions
 - c. the applications of properties of exponents to simplify algebraic expressions involving integer exponents
5. Using variables to create algebraic expressions modeling an application problem
6. Converting numbers between scientific notation and standard notation
7. Solving linear equations in one variable
 - a. addition & subtraction property of equality
 - b. multiplication & division property of equality
8. Creating equations that model situations described in application problems
9. Solving linear inequalities in one variable
 - a. addition & subtraction property of inequality
 - b. multiplication & division property of inequality
10. Creating inequalities that model situations described in application problems
11. Graphing solutions of linear equations and linear inequalities in one variable on a real number line
12. Polynomial arithmetic
 - a. combining like terms
 - b. adding and subtracting polynomials
 - c. using the distributive property to multiply polynomials
 - d. dividing polynomials by monomials
 - e. dividing polynomials by polynomials using polynomial long division
13. Factoring out the greatest common factor from a polynomial expression
14. Factoring simple quadratic polynomials
 - a. factoring polynomials with four terms by grouping
 - b. factoring polynomials of the form x^2+bx+c or $x^2+bxy+cy^2$ by analyzing b and c and making educated guesses and checking
 - c. identifying prime polynomials of the form x^2+bx+c or $x^2+bxy+cy^2$ by analyzing b and c and making educated guesses and checking
 - d. factoring polynomials of the form ax^2+bx+c by factoring out the GCF of the coefficients
 - e. factoring polynomials of the form ax^2+bx+c by analyzing b and c and making educated guesses and checking
15. Solving rational equations that reduce to linear equations
16. Discussing roots and radicals

- a. comparing square roots and radicals
 - b. evaluating and simplifying radical expressions
 - c. solving simple radical equations
17. Analyzing linear equations in two variables
- a. Verifying solutions
 - b. Describing solution sets
 - c. solving for one variable
 - d. graphing the solution sets in a Cartesian plane
 - e. the slope formula of a line
 - f. the standard form ($Ax + By = C$) for the equation of a line in a plane
 - g. the point-slope form for the equation of a line in a plane
 - h. the slope-intercept form for the equation of a line in a plane and its uniqueness

Course Objectives

	Objectives
Objective 1	Identify, recognize, and classify real numbers, as integers, rational numbers, or irrational numbers and locate their approximate positions on the real number line.
Objective 2	Describe the concept of variables and express unknown quantities and ranges of quantities with variables.
Objective 3	Apply the commutative, associative, distributive, identity, and inverse properties to simplify algebraic expressions involving polynomial, rational and radical expressions.
Objective 4	Evaluate and simplify algebraic expressions using the order of operations and the commutative, associative, distributive, identity, and inverse properties of real numbers.
Objective 5	Use the properties of integer exponents to simplify algebraic expressions, including expressions involving scientific notation.
Objective 6	Analyze the concept of an algebraic equation and demonstrate the meaning of a solution to the equation, including integer, non-integer rational, decimal and radical solutions.
Objective 7	Create and solve algebraic equations or inequalities that model application problems.
Objective 8	Employ properties of equality to solve linear equations in one variable and represent solution sets with appropriate notation.
Objective 9	Employ properties of inequality to solve linear inequalities in one variable and represent solution sets with appropriate notation and graphically.
Objective 10	Interpret the slope of a line as the constant rate of change of the variable on the vertical axis with respect to the change of the variable on the horizontal axis.
Objective 11	Use point-slope and slope-intercept forms of lines to graph linear equations in two variables.
Objective 12	Construct linear equations in two variables of lines given the graph, two points, or a point and the slope using the point-slope and/or slope-intercept form of the equation of a line.
Objective 13	Solve systems of two linear equations in two variables both algebraically (substitution and elimination/addition) and graphically.
Objective 14	Add, subtract, multiply, divide, and simplify polynomials.
Objective 15	Factor the greatest common factor from a polynomial expression.
Objective 16	Factor quadratic binomials and trinomials with integer coefficients.
Objective 17	Solve quadratic equations in one variable by factoring and applying the zero product property.
Objective 18	Use the method of completing the square to solve quadratic equations with integer coefficients.
Objective 19	Add, subtract, multiply, divide, and simplify rational expressions.
Objective 20	Solve rational equations that simplify to linear or quadratic equations.
Objective 21	Evaluate square roots and solve radical equations.
Objective 22	Apply the Pythagorean Theorem to find side lengths of right triangles.
Objective 23	Use proportionality to discover side lengths of similar triangles.
Objective 24	Use basic formulas from geometry to calculate perimeter, area, and volume of basic figures.
Objective 25	Apply learned principles and skills to novel situations in addition to situations that mimic those on the homework and those shown in class.
Objective 26	Use mathematical language to communicate ideas, especially in writing.

Student Learning Outcomes

Upon satisfactory completion of this course, students will be able to:	
Outcome 1	Define and use variables to create linear expressions and equations to model change and patterns in a variety of applications.
Outcome 2	Use the information obtained in application problems to estimate a reasonable solution, identify and execute methods of solution that involve algebraic computations, and evaluate the reasonableness of results.
Outcome 3	Apply algebraic principles and deductive reasoning to solve linear equations and inequalities and represent solution sets using number lines and Cartesian planes.
Outcome 4	Apply algebraic principles and deductive reasoning to solve quadratic equations.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Laboratory	Students will participate in individual and group exploration of course topics. Professor, ISA(s), and students will discuss and explore course topics.
Discussion	Discussion will be used to review, analyze, and evaluate various methods of problem solving.
Lecture	Lecture will be used for introduction on explanation of course topics.
Technology-based instruction	Students will complete problem sets and receive feedback (automated and/or from professor) on assignments.
Demonstration, Repetition/Practice	Students will be given additional problem sets to complete on their own to improve skills.

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Computational/problem-solving evaluations	Students will solve problems that involve the course topics. They will receive feedback on their answers and explanations from the professor. Students will not be allowed to use calculators except on select problems (such as certain problems involving irrational numbers).	In and Out of Class
Tests/Quizzes/Examinations	Students may take quizzes, tests, and/or exams for grade and/or self-evaluation purposes. Students will not be allowed to use calculators except on select problems (such as certain problems involving irrational numbers).	In and Out of Class
Written homework	Students will be assigned homework covering topics from lecture. The problems will require critical thinking and problem-solving beyond that of simple computation or procedural exercises. Students are not allowed to use calculator to complete the homework assignments. Students will not be allowed to use calculators except on select problems (such as certain problems involving irrational numbers).	In and Out of Class
Mid-term and final evaluations	Students will be evaluated by a comprehensive final exam. Students are not allowed to use calculator on the final exam. Students may be evaluated by one or more mid-term exams as well.	In Class Only
Laboratory projects	Students may be evaluated by their participation in lab activities and may be required to turn in write-ups of these activities.	In Class Only
Other	Out-of-class hours will be accounted for electronically through the learning management system.	Out of Class Only

Assignments

Other In-class Assignments

1. Students taking face-to-face sections will be expected to attend classroom lectures and take notes.
2. Students taking online and/or hybrid and/or Hyflex sections will be expected to participate in the lecture activities as created for the particular section and take appropriate notes.

Other Out-of-class Assignments

1. Students will be expected to read the textbook and/or other reading material outside of class and take appropriate notes.
2. Students will be expected to review their notes from lecture and reading in preparation for exams and as resources for out-of-class assignments.

Grade Methods

Pass/No Pass Only

Distance Education Checklist

Include the percentage of online and on-campus instruction you anticipate.

Online %

100

On-campus %

0

What will you be doing in the face-to-face sections of your course that necessitates a hybrid delivery vs a fully online delivery?

Although the course can be offered entirely online, it may also be offered in a hybrid format to take advantage of collaboration activities that are more suited to in-person interaction.

Examinations may be given in a controlled location if proctoring of that nature is required by the instructor.

Lab Courses

Instructional Materials and Resources

If you use any other technologies in addition to the college LMS, what other technologies will you use and how are you ensuring student data security?

Professors will use MyOpenMath and/or other free courseware or other technology. Only technology that is considered safe for both faculty and student use will be used. Whenever possible, technology will be integrated with Canvas to decrease the amount of signing in and out of various accounts and/or requiring less secure web-browser settings.

If used, explain how specific materials and resources outside the LMS will be used to enhance student learning.

MyOpenMath allows faculty to assign pre-written and instructor-created assignments that are more appropriate for quality learning than those that can be created in Canvas while still receiving instantaneous feedback.

Effective Student/Faculty Contact

Which of the following methods of regular, timely, and effective student/faculty contact will be used in this course?

Within Course Management System:

Discussion forums with substantive instructor participation
Online quizzes and examinations
Private messages
Regular virtual office hours
Timely feedback and return of student work as specified in the syllabus
Weekly announcements

External to Course Management System:

Direct e-mail
Posted audio/video (including YouTube, 3cm mediasolutions, etc.)
Synchronous audio/video
Telephone contact/voicemail

For hybrid courses:

Orientation, study, and/or review sessions
Scheduled Face-to-Face group or individual meetings

Briefly discuss how the selected strategies above will be used to maintain Regular Effective Contact in the course.

Faculty will regularly contact students individually and as a group through Canvas messages and/or college email. Students will also receive regular announcements with course, college, or other relevant information.
In discussions and through other lab assignments, students will communicate with each other and their professor regularly and frequently.

If interacting with students outside the LMS, explain how additional interactions with students outside the LMS will enhance student learning.

Students may prefer to contact their professor via email or on the phone, which allows for an improved experience for those who communicate better in those contexts. The professor may direct students to access free supplemental resources as well.

Other Information**MIS Course Data****CIP Code**

27.0101 - Mathematics, General.

TOP Code

170100 - Mathematics, General

SAM Code

E - Non-Occupational

Basic Skills Status

Basic Skills

Prior College Level

Not applicable

Cooperative Work Experience

Not a Coop Course

Course Classification Status

Other Non-credit Enhanced Funding

Approved Special Class

Not special class

Noncredit Category

Elem/Secondary Basic Skills

Funding Agency Category

Not Applicable

Program Status

Program Applicable

Transfer Status

Not transferable

General Education Status

Y = Not applicable

Support Course Status

S = Course is a support course

Allow Audit

Yes

Repeatability

Yes

Repeatability Limit

NC

Repeat Type

Noncredit

Justification

The course is designed to allow students to learn, re-learn, and/or practice material that is fundamental to mathematics study. If a student has taken the course but is not confident enough in their skills to sign up for a more advanced course, they may repeat this course to improve both skills and confidence.

Materials Fee

No

Additional Fees?

No

Approvals**Curriculum Committee Approval Date**

11/01/2022

Academic Senate Approval Date

11/10/2022

Board of Trustees Approval Date

12/16/2022

Chancellor's Office Approval Date

01/07/2023

Course Control Number

CCC000635371

Programs referencing this coursePre-Algebra and Beginning Algebra Certificate of Competency (<http://catalog.collegeofthedesert.eduundefined/?key=381>)