MATH 065: A PREPARATION FOR THE STUDY OF ALGEBRA

Originator
ljordan

Justification / Rationale
Add OER textbook
Add online modality

Effective Term
Fall 2022

Credit Status
Credit - Non Degree Applicable

Subject
MATH - Mathematics

Course Number
065

Full Course Title
A Preparation for the Study of Algebra

Short Title
PRE-ALGEBRA

Discipline

Disciplines List
Mathematics

Modality
Face-to-Face
100% Online
Hybrid

Catalog Description
This is a course in the elementary operations required for algebra. Topics include adding, subtracting, multiplying, and dividing integer numbers, decimals, fractions and mixed numbers with an introduction to the concept and uses of variables. Other topics include arithmetic with percents, ratios, rates and proportions, the metric and American system of measurement, including the conversion of units, simplifying algebraic expressions and elementary geometry concepts such as perimeter, area, and volume.

Schedule Description
This course covers adding, subtracting, multiplying, and dividing integer numbers, fractions, mixed numbers and decimals with an introduction of variable expressions to prepare students for algebra.
Advisory: ENG 061 & RDG 061

Lecture Units
3

Lecture Semester Hours
54

Lab Units
1

Lab Semester Hours
54

In-class Hours
108

Out-of-class Hours
108

Total Course Units
4

Total Semester Hours
216

Prerequisite Course(s)
Advisory: ENG 061 & RDG 061

Required Text and Other Instructional Materials

Resource Type
Book

Open Educational Resource
Yes

Formatting Style
MLA

Author
Department of Math, College of the Redwoods

Title
Prealgebra Textbook

Publisher
Department of Math, College of the Redwoods

Year
2013

College Level
No

Resource Type
Book

Open Educational Resource
No

Formatting Style
MLA

Author
Martin-Gay

Title
Basic College Mathematics with Early Integers

Edition
3rd

Publisher
Pearson

Year
2014

College Level
No

Flesch-Kincaid Level
8.2

ISBN #
9780321922342

Resource Type
Book
Open Educational Resource
Yes

Author
Lynn Marecek

Title
Pre-Algebra

Edition
2nd

Publisher
OpenStax

Year
2020

College Level
No

ISBN #
978-0-9986257-9-9

Class Size Maximum
30

Entrance Skills
ADVISORY SKILLS:
Read at an 8th grade level.

Requisite Course Objectives
ENG 061-Demonstrate the ability to think critically and express ideas using various patterns of development.
ENG 061-Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.
RDG 061-Read a variety of texts fluently.

Course Content

1. Basic number facts.
2. Addition, subtraction, multiplication, and division of rational numbers in fraction or mixed number form.
3. Natural number exponents and the order of operations involving fractions, mixed numbers and decimals.
4. Methods of finding the greatest common factor and least common multiple using prime factorizations.
5. Decimal notation and place value, including comparing, ordering, estimating and rounding decimals; and locate decimals on the real number line.
6. Addition, subtraction, multiplication and division of decimals.
7. Converting between decimals, fractions, and mixed numbers.

8. Ratios and rates, and the concept of proportions, including solving proportion problems.
9. Percents, converting between percents, fractions, and decimals; and solving percent problems using an equation or a proportion.
10. American and metric measurement units of length, volume, weight and time, including conversion within and between systems involving fractions, mixed numbers and decimals.
11. Perimeter and area of basic geometric figures such as rectangles, squares, triangles, and circles and figures that can be broken down into two or more of these.
12. Square roots and the Pythagorean Theorem.
13. Volume of basic geometric solids such as a rectangular solid, cylinder, and cone.
14. The concept of a variable.
15. Translating statements into the language of algebra.
16. Simplifying algebraic expressions; the use of the commutative, associative and distributive properties and the order of operations.
17. Rules of natural number exponents involving variables.
18. Add, subtract, multiply and divide rational expressions whose numerator and denominator are monomials.
19. Evaluate algebraic expressions for rational number and decimal values of variables.
20. Applications involving these concepts and skills

Lab Content

1. Demonstrate mental math skills by multiplying whole numbers quickly. Using web based timed entry format or an in-class timed session.
2. Participate in discussion of lectured material through question and answer format to improve understanding of new concepts.
3. Practice basic math skills by hand calculations of integers, fractions and decimals.
4. Discuss various methods of simplification of arithmetic and algebraic expressions.
5. Participate in skill lab by working on either paper or web based assignments to practice skills learned in lectures.
6. Receive academic assistance from instructor, ISAs and tutors on individual or group basis.

Course Objectives

	Objectives
Objective 1	Demonstrate proficiency in basic number facts (addition, subtraction, multiplication, division of integer numbers).
Objective 2	Comprehend the concept of a fraction as a part of a whole.
Objective 3	Convert between improper fractions and mixed numbers.
Objective 4	Compute using the four basic operations of addition, subtraction, multiplication, and division on the rational numbers in both fraction and mixed number forms.
Objective 5	Apply prime factorization to simplify fractions and find least common multiples.
Objective 6	Use the fundamental property of fractions and prime factorizations to write equivalent fractions.
Objective 7	Apply the basic operations to solve application problems that involve integer numbers, decimals, mixed numbers and rational numbers.
Objective 8	Apply the order of operations to simplify expressions involving several operations using rational numbers, mixed numbers and decimals.
Objective 9	Use rounding and estimation to solve problems involving rational numbers, mixed numbers and decimals.
Objective 10	Employ decimal notation and place value to compare, order, and round numbers.
Objective 11	Use the concept of ratio or rate involving both rational numbers, mixed numbers and decimals to determine the solution to a proportion problem.
Objective 12	Apply methods of conversion between percents, decimals, and fractions.
Objective 13	Determine the solution to equations involving percents by deductive reasoning.
Objective 14	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.
Objective 15	Use unit measure appropriately in applications involving rational numbers, mixed numbers and decimals.
Objective 16	Use concepts and formulas from geometry.
Objective 17	Compute square roots of natural numbers, fractions and decimals; and use the Pythagorean Theorem to solve simple right triangle problems.
Objective 18	Locate integer numbers, rational numbers, mixed numbers and decimals on the real number line.
Objective 19	Understand the concept of a variable and how a variable can be used to represent an unknown quantity.
Objective 20	Distinguish between various subsets of the rational numbers including natural numbers, whole numbers, and integers.

Objective 21	Apply the commutative, associative, distributive, inverse and identity properties to simplify algebraic expressions involving fraction, mixed number and decimal coefficients.
Objective 22	Use the properties of natural number exponents to simplify algebraic expressions.
Objective 23	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.
Objective 24	Explain the concepts of terms, factors, variable and coefficient.

Student Learning Outcomes

	Upon satisfactory completion of this course, students will be able to:
Outcome 1	Combine the abilities to judge relative sizes of numbers, perform computations with numbers in different representations, and assess the reasonableness of results in order to demonstrate number sense.
Outcome 2	Use the information obtained in application problems to estimate a reasonable solution, determine appropriate methods of solution that involve arithmetic and algebraic computations, execute those methods of solution, and compare the results to the estimate.
Outcome 3	Apply algebraic principles and deductive reasoning to perform computations with symbolic expressions.
Outcome 4	Use proportional reasoning to describe relationships between quantities and determine the values of unknown quantities.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Laboratory	Lab will be used, in groups or individually, for student exploration of the topics of the course.
Discussion	Discussion will be used to review, analyze, and evaluate various methods of solution.
Lecture	Lecture will be used for introduction on explanation of course topics.

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Written homework	Students will be evaluated by homework assignments covering topics from lecture. Students are not allowed to use calculator to complete the homework assignments. Students will typically be assigned 5-6 hours of homework per week.	Out of Class Only
Mid-term and final evaluations	Students will be evaluated by examinations involving problems that require the application of studied principles and skills to new situations as well as problems that mimic those done on homework and in class. Students are not allowed to use calculator to complete the mid-term and evaluations.	In Class Only
Computational/problem-solving evaluations	Students will be evaluated by completing challenging problem sets requiring careful reasoning and application of a variety of course topics. Students are not allowed to use calculator to complete the assignments.	In Class Only
Student participation/contribution	Students will be evaluated by their participation in lab activities and may be required to turn in write-ups of these activities.	In Class Only
Mid-term and final evaluations	Students will be evaluated by a comprehensive two-hour final exam. Students are not allowed to use calculator to complete the final exam.	In Class Only

Student participation/contribution	Students will be expected to read the textbook before coming to class as well as reviewing their notes after class. Students will be evaluated on their preparation and review by their performance on homework and exams. Students should typically spend an average of 1-2 hours per week on preparation and review.	Out of Class Only

Assignments

Other In-class Assignments

1. Attending classroom lectures and taking notes.
2. Participate in classroom discussions to review, analyze, diagnose and evaluate various methods of solution used on their homework.

Other Out-of-class Assignments

1. Reading textbook and supplementary assignments.
2. Review notes.
3. Complete assigned homework including exercises designed to improve problem solving, computational skills and mathematical understanding. Complete assigned homework including exercises designed to improve problem solving, computational skills and mathematical understanding.

Grade Methods

Letter Grade 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 hybrid to take advantage of collaboration activities that are more suited to in-person interaction.
Examinations can be given in a controlled location.

Lab Courses

How will the lab component of your course be differentiated from the lecture component of the course?

Lab assignments are designed to engage the student in active learning. Lab assignments help to improve the students skills by synthesizing the material that was presented in lecture.

From the COR list, what activities are specified as lab, and how will those be monitored by the instructor?

The following lab activities are discussions and assignments that involve solving problems or exploring concepts with other students under the guidance of the professor or instructional support assistant.
1. Demonstrate mental math skills by multiplying whole numbers quickly. Using web based timed entry format or an in-class timed session.
2. Participate in discussion of lectured material through question and answer format to improve understanding of new concepts.
3. Practice basic math skills by hand calculations of integers, fractions and decimals.
4. Discuss various simplification methods of arithmetic and algebraic expressions.
5. Participate in skill lab by working on either paper or web based assignments to practice skills learned in lectures.
6. Receive academic assistance from instructor, ISAs and tutors on individual or group basis.

Discussions and other assignments that are completed in Canvas are monitored and evaluated by the professor. Assignments that do not take place in Canvas are
evaluated by the professor based on write-ups (which may include summaries and feedback from the participants). Anonymous and non-anonymous feedback opportunities will be available to students to allow the professor further monitor effectiveness and appropriateness of activities that take place somewhere other than on the course LMS

How will you assess the online delivery of lab activities?

Assessments of the lab activities will be submitted using the course LMS for evaluation and feedback.

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?

Depending on the textbook used, the professor may choose to use the free OER MyOpenMath, or Pearson MyLab and Mastering, Cengage WebAssign. All of these are considered to be safe for use in education for both faculty and students. All can also be integrated with the college LMS (Canvas), which decreases the amount of times students will need to sign-in-and-out of accounts and open them up to data breaches.

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

Professors who choose to use MyOpenMath, Pearson MyLab and Mastering, Cengage WebAssign, or do so in order to assign instructor designed custom problems, problems designed by a colleague at COD or another institution, or pre-made problems that have been vetted by the instructor that are more sophisticated 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, 3cmediasolutions, 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 COD email. Students will also receive regular announcements with information about the course, COD as a whole, 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
Three levels below transfer

Cooperative Work Experience
Not a Coop Course

Course Classification Status
Credit Course

Approved Special Class
Not special class

Noncredit Category
Not Applicable, Credit Course

Funding Agency Category
Not Applicable

Program Status
Stand-alone

Transfer Status
Not transferable

Allow Audit
No

Repeatability
No

Materials Fee
No

Additional Fees?
No

Approvals

Curriculum Committee Approval Date
11/18/2021

Academic Senate Approval Date
12/09/2021

Board of Trustees Approval Date
01/21/2022

Chancellor's Office Approval Date
01/05/2019

Course Control Number
CCC000599885