UNIVERSITY of HAWAI'I®
WINDWARD
COMMUNITY COLLEGE

MATH 103 – COLLEGE ALGEBRA

4 Credits, CRN: 61036
MW, 5:30 pm – 7:20 pm; 1/10 – 5/13

INSTRUCTOR: David William K.W.L. DONLIN, Lecturer, Mathematics

VIRTUAL CLASSROOM: https://meet.google.com/wxz-unpx-enf

OFFICE: https://meet.google.com/wxz-unpx-enf

OFFICE HOURS: MW, 5:00 pm – 5:30 pm, 7:20 pm – 8:00 pm
or by appointment

EMAIL: donlind@hawaii.edu

EFFECTIVE DATE: Spring 2022

WINDWARD COMMUNITY COLLEGE MISSION STATEMENT

Windward Community College offers innovative programs in the arts and sciences and opportunities to gain knowledge and understanding of Hawai'i and its unique heritage. With a special commitment to support the access and educational needs of Native Hawaiians, we provide the Ko'olau region of O'ahu and beyond with liberal arts, career and lifelong learning in a supportive and challenging environment — inspiring students to excellence.

CATALOG DESCRIPTION

Linear equations, inequalities, systems of equations, polynomials, functions, fractional expressions and equations, exponents, powers, roots, quadratic equations and functions; rational, exponential and logarithmic functions.

STUDENT LEARNING OUTCOMES

As a result of taking this course, students can expect to attain the following outcomes:

1. Graph or interpret algebraic relations that are relevant to the topics in this course
2. Employ algebraic techniques to find the solutions to equations or inequalities, or systems of equations or inequalities appropriate to the level of this course
3. Use algebraic techniques to analyze and solve applied problems
4. Utilize precise mathematical language and symbols to effectively communicate mathematics in written and/or oral form

COURSE TASKS

The mode of instruction is primarily discussion-problem solving where the initial portion of each class period may be utilized to discuss and clarify any questions from the preceding class meeting and/or assignment, and the remaining portion is used to discuss new material. Lectures, directed student explorations, group work, appropriate technologies, and projects will also be used as appropriate. After the completion of each unit, a review and exam will be conducted.

The student will demonstrate competency in the objectives by participating in and completing all class activities, by completing and turning in all assignments as requested, by taking unit tests, and by taking a final exam over concepts and skill covered in the entire course. Class activities, unit tests, and the final exam are to be taken in the classroom and without any references unless otherwise stipulated by the instructor.

It is the **student's responsibility** to obtain and complete all assignments that are given in any class meeting for which the student is unable to attend. Unless permission is granted by the instructor beforehand, assignments and tests must be completed and submitted to the instructor at the specified date and time.

Absences

If you are absent you are responsible for any important announcements or assignments given during the class you missed. Advanced warning of absences are appreciated, but not required; however, it does help me to help you if you keep me posted. You can also arrange to meet with me during office hours to review any missed lecture material.

Calculators

Non-graphing calculators are allowed on exams. A calculator may be used on homework as needed.

Exams

There are no retests or make-ups for exams. The final exam is cumulative. If you are unable to attend class on an exam day, it may be possible for you to take the exam earlier than the specified day/time. You must contact the instructor ahead of time to arrange this.

* If the percent earned on the final exam is higher than your lowest exam score, then your lowest exam score will be replaced with the percent earned on the final exam.

Homework

Homework will be completed online via the MyLab Math program. Keep in mind that homework is not simply a task to be completed but an opportunity to practice at your own pace. You may need to do more than the assigned homework problems to become comfortable with the concepts and skills; you may have to repeat problems to make sure you understand.

Student Exemplars

For every section we cover you will select any one of the problems from the MyLab Math homework set in that section for at most 3 points per problem. These solutions will be posted on Laulima, details on this particular assignment will be posted there as well.

In-Class Activities

In-class worksheets will be turned in for credit. These activities are considered class participation points. You may not make up in-class activities.

ASSESSMENT TASKS AND GRADING

Grading

To receive full credit for problems done on exams and in-class activities, you must show sufficient work in a clear and organized manner to display your understanding of the content. Messy and/or disorganized work will not receive full credit.

Points will be assigned to each graded assignment, class activity, and tests as follows:

3 Exams (100 Points Each)	300 points	60%
Final Exam	120 points	15.0%
Student Exemplars	99 points	12.5%
MyLab Math	100 points	12.5%
Total		100%

Course Grade

A letter grade for the course will be assigned according to the level of achievement as provided in the table below:

Grade	Definition
A	90% – 100% of the cumulative points possible
B	80% – 89% of the cumulative points possible
C	70% – 79% of the cumulative points possible
D	60% – 69% of the cumulative points possible
F	less than 60% of the cumulative points possible.
N	definition listed below
Cr	70% – 100% of the cumulative points possible
NC	less than 70% of the cumulative points possible

Note: CR/NC grades require written instructor consent. Students must apply for CR/NC grading option at the Admissions Office by the posted deadline. If a student does not apply for CR/NC grading option at the Admissions Office by the required deadline and if s/he does not withdraw, a letter grade (A, B, C, D, F, N) will be assigned for the course.

Note: The W grade is given only when the student officially withdraws from the course by the posted deadline. If a student withdraws from this course they must also withdraw from the companion Math 88 course.

Note: *The I grade is a temporary grade given at the instructor's option when a student has failed to complete a small part of a course because of circumstances beyond his or her control.* A student may qualify for the "I" grade if: (a) they are unable to take the final exam and (b) taking the final exam could possibly raise their course grade. The "I" grade is given by student request and must be approved by the instructor.

Note: The N grade is given at the discretion of the instructor and only when the criteria for the N grade is met by the student. Consult the WCC Catalog for the criteria of the N grade.

Note: Students must apply for the Cr/NC grading option at the Admissions Office. Consult the WCC Catalog for deadlines.

Note: W grade is given only when the student officially withdraws from the course at the Admissions Office. Consult the WCC Catalog for deadlines.

LEARNING RESOURCES

Required Materials

Pearson – MyLab Math:

- https://www.pearson.com/mylab
- Course ID: donlin35160

To register for Math 103 - Fall 2021:

1. Go to https://www.pearson.com/mylab.
2. Under Register, select **Student**.
3. Confirm you have the information needed, then select **OK! Register now**.
4. Enter your instructor's course ID: donlin35160, and **Continue**.
5. Enter your existing Pearson account **username** and **password** to **Sign In**.
    a. You have an account if you have ever used a MyLab or Mastering product.
        - If you don't have an account, select **Create** and complete the required fields.
6. Select an access option.
    a. Enter the access code that came with your textbook or that you purchased separately from the bookstore.
    b. If available for your course,
        - Buy access using a credit card or PayPal.
        - Get temporary access.
    c. If you're taking another semester of a course, you skip this step.
7. From the "You're Done!" page, select **Go To My Courses**.
8. On the My Courses page, select the course name **Math 103 - Spring 2022** to start your work.

To sign in later:

1. Go to https://www.pearson.com/mylab.
2. Select **Sign In**.
3. Enter your Pearson account **username** and **password,** and **Sign In**.
4. Select the course name **Math 103 - Spring 2022** to start your work.

To upgrade temporary access to full access:

1. Go to https://www.pearson.com/mylab.
2. Select **Sign In**.
3. Enter your Pearson account **username** and **password,** and **Sign In**.
4. Select **Upgrade access** for **Math 103 - Spring 2022**.
5. Enter an access code or buy access with a credit card or PayPal.

Google Classroom:

- Access through your UH Gmail account with Class Code: sbee7l4

Laulima:

- "College Algebra" tab when logged into Laulima

Learning Resources

- Textbook: *Lial, Hornsby, McGinnis. (2020) Algebra For College Students, 9th Edition*
- Tutor.com: https://windward.hawaii.edu/tutor.com/
- OLA (UH online tutoring program): http://manoa.hawaii.edu/ola/
- TRiO: http://windward.hawaii.edu/TRIO/index.php
- Khan Academy Videos: http://www.khanacademy.org
- Desmos online graphing calculator: https://www.desmos.com/calculator
- Photomath phone app: https://www.photomath.net/en/
- Symbolab phone app: https://www.symbolab.com
- Socratic: While it covers multiple subjects, for math it can show solutions as well as links to online resources (https://socratic.org)
- Google Search – but go to "Images" then "Videos", reading is dumb

DISABILITIES ACCOMMODATIONS

If you have a physical, sensory, health, cognitive, or mental health disability that could limit your ability to fully participate in this class, you are encouraged to contact the Accessibility Counselor to discuss reasonable accommodations that will help you succeed in this class. Roy Inouye can be reached at (808) 235-7448, royinouy@hawaii.edu, or you may stop by Hale Kākoʻo 106 for more information.

SEX DISCRIMINATION AND GENDER-BASED VIOLENCE RESOURCES (TITLE IX)

Windward Community College is committed to providing a learning, working, and living environment that promotes personal integrity, civility, and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking.

If you or someone you know is experiencing any of these, WCC has staff and resources to support and assist you. To report an incident of sex discrimination or gender-based violence, as well as receive information and support, please contact one of the following:

Jojo Miller, Confidential Advocate
Phone: (808) 348-0663
Email: advocate@hawaii.edu
Office: Hale Kākoʻo 110

Desrae Kahale, Mental Health Counselor & Confidential Resource
Phone: (808) 235-7393
Email: dkahale3@hawaii.edu
Office: Hale Kākoʻo 101

Karla K. Silva-Park, Title IX Coordinator
Phone: (808) 235-7468
Email: karlas@hawaii.edu
Office: Hale ʻĀkoakoa 220

As a member of the University faculty, I am required to immediately report any incident of sex discrimination or gender-based violence to the campus Title IX Coordinator. Although the Title IX Coordinator and I cannot guarantee confidentiality, you will still have options about how your case will be handled. My goal is to make sure you are aware of the range of options available to you and have access to the resources and support you need.

For more information regarding sex discrimination and gender-based violence, the University's Title IX resources and the University's Policy, Interim EP 1.204, go to manoa.hawaii.edu/titleix/

ACADEMIC INTEGRITY

Work submitted by a student must be the student's own work. In this class, students who commit academic dishonesty, cheating or plagiarism will have the following consequence(s):

Students will receive a failing grade for plagiarized assignments.

All cases of academic dishonesty are referred to the Vice Chancellor for Student Affairs.

Academic Honesty

All exams must be done by your own individual effort. You may not consult with any classmates while taking exams. This would fall under the guidelines of academic integrity and any evidence of cheating will result in a score of 0 for all parties involved. An "F" will be assigned to students involved in cheating and will be reported to the Dean. See http://windward.hawaii.edu/Policies/ for more information on the UH system-wide student conduct code.

ALTERNATE CONTACT INFORMATION

If you are unable to contact the instructor, have questions that your instructor cannot answer, or for any other issues, please contact the Academic Affairs Office:

- Location: Alakaʻi 121
- Phone: (808) 235-7422

COURSE CONTENT

DONLIN – Spring 2022; MW 5:30 – 7:20 PM (CRN: 61036)
Academic Calendar: http://windward.hawaii.edu/academics/Calendar/
January 9 – Last Day of Regular Registration
January 18 – Last Day to Add/Late Register, Last Day for 100% Refund
February 2 – Last Day for 50% Refund, Last Day to Withdraw *without* a "W" Grade
March 28 – Last Day to Establish C/NC and Audit Options, Last Day to Withdraw *with* a "W"
May 4 – Last Day of Instruction
May 13 – Last Day of the Semester
Holidays for the Semester
January 17 – Dr. Martin Luther King Day
February 21 – President's Day
March 14-18 – Spring Recess
March 25 – Kuhio Day
April 15 – Good Friday

*Note that the schedule below is subject to change. Students will be notified of any changes.

Date	Class	Homework Pacing Guide
1/10	**Syllabus,** R.2 – Basic Concepts from Algebra	
1/12	R.4 – Exponents, Roots, and Order of Operations 1.1 – Linear Equations in One Variable 1.5 – Linear Inequalities in One Variable	
1/17	*Dr. Martin Luther King Jr. Day (No Classes)*	
1/19	1.6 – Set Operations and Compound Inequalities 1.7 – Absolute Value Equations and Inequalities	R.2, R.4 1.1, 1.5
1/24	2.1 – Linear Equations in Two Variables 2.2 – The Slope of a Line	1.6, 1.7
1/26	2.3 – Writing Equations of Lines 2.4 – Linear Inequalities in Two Variables	
1/31	2.5 – Introduction to Relations and Functions 2.6 – Function Notation and Linear Functions	2.1, 2.2, 2.3, 2.4
2/2	3.1 – Systems of Linear Equations in Two Variables 3.2 – System of Linear Equations in Three Variables 3.3 – Applications of Systems of Linear Equations	
2/7	4.1 – Integer Exponents 4.2 – Scientific Notation 4.3 – Adding and Subtracting Polynomials 4.4 – Polynomial Functions, Graphs, and Composition	2.5, 2.6, 3.1, 3.2, 3.3
2/9	4.5 – Multiplying Polynomials 4.6 – Dividing Polynomials	
2/14	Exam 1 Review	4.1, 4.2, 4.3, 4.4, 4.5, 4.6
2/16	**Exam 1 – Chapters R, 1, 2, 3, 4**	
2/21	5.1 – Greatest Common Factors and Factoring by Grouping 5.2 – Factoring Trinomials 5.3 – Special Factoring	
2/23	5.5 – Solving Quadratic Equations Using the Zero-Factor Property 6.1 – Rational Expression and Functions; Multiplying and Dividing	
2/28	6.2 – Adding and Subtracting Rational Expressions 6.3 – Complex Fractions 6.4 – Equations with Rational Expressions and Graphs	5.1, 5.2, 5.3, 5.5 6.1
3/2	6.5 – Applications of Rational Expressions 6.6 – Variation	

3/7	7.1 – Radical Expressions and Graphs 7.2 – Rational Exponents 7.3 – Simplifying Radicals, the Distance Formula, and Circles 7.4 – Adding and Subtracting Radical Expressions	6.2, 6.3, 6.4, 6.5, 6.6
3/9	7.5 – Multiplying and Dividing Radical Expressions 7.6 – Solving Equations with Radicals 7.7 – Complex Numbers	
3/14	*Spring Recess*	
3/16	*Spring Recess*	
3/21	8.1 – The Square Root Property and Completing the Square 8.2 – The Quadratic Formula 8.3 – Equations that Lead to Quadratic Methods	7.1, 7.2, 7.3, 7.4, 7.5, 7.7
3/23	8.4 – Formulas and Further Applications 8.5 – Polynomial and Rational Inequalities	
3/28	Exam 2 Review	8.1, 8.2, 8.3, 8.4, 8.5
3/30	**Exam 2 – Chapter 5, 6, 7, 8**	
4/4	9.1 – Review of Operation and Composition 9.3 – More About Parabolas and Their Applications	
4/6	10.2 – Exponential Functions 10.3 – Logarithmic Functions	
4/11	10.4 – Properties of Logarithms 10.5 – Common and Natural Logarithms	9.1, 9.3 10.2, 10.3
4/13	10.6 – Exponential and Logarithmic Equations; Further Applications 11.4 – Graphs and Applications of Rational Functions	
4/18	12.1 – Circles Revisited ~~and Ellipses~~ 12.3 – Nonlinear Systems of Equations	10.4, 10.5, 10.6, 11.4
4/20	12.4 – Second Degree Inequalities, Systems of Inequalities, and Linear Programming	
4/25	Exam 3 Review	12.1, 12.3, 12.4
4/27	**Exam 3 – Chapters 9, 10, 11, & 12**	
5/2	Final Exam Review	Use this time to catch up on
5/4	Final Exam Review	Homework and Exemplars
5/9	No Class (Final Exams Week)	

5/11	**Final Exam: 5:30 pm – 7:30 pm** Final Due Date for Homework and Exemplars: 5/14 @ 5:30 pm	

Chapter R

Section R.2 Basic Concepts from Algebra

OB.1 – Write Sets using Set Notation

~~*OB.2 – Use Number Lines*~~

~~*OB.3 – Classify Numbers*~~

~~*OB.4 – Find Additive Inverses*~~

OB.5 – Use Absolute Value

~~*OB.6 – Use Inequality Symbols*~~

Section R.4 Exponents, Roots, and Order of Operations

~~*OB.1 – Add Real Numbers*~~

~~*OB.2 – Subtract Real Numbers*~~

OB.3 – Use the rules for Order of Operations

~~*OB.4 – Multiply Real Numbers*~~

~~*OB.5 – Find Reciprocals and Divide Real Numbers*~~

Chapter 1

Section 1.1 – Linear Equations in One Variable

OB.1 – Distinguish between Expressions and Equations

OB.2 – Identify Linear Equations

OB.3 – Solve Linear Equations using the Addition and Multiplication Properties of Equality

OB.4 – Solve Linear Equations using the Distributive Property

OB.5 – Solve Linear Equations with Fractions or Decimals

OB.6 – Identify Conditional Equations, Contradictions, and Identities

Section 1.5 – Linear Inequalities in One Variable

OB.1 – Graph Intervals on a Number Line

OB.2 – Solve Linear Inequalities using the Addition Property

OB.3 – Solve Linear Inequalities using the Multiplication Property

OB.4 – Solve Linear Inequalities with Three Parts

~~OB.5 – Solve Applied Problems Using Linear Inequalities~~

Section 1.6 – Set Operations and Compound Inequalities

OB.1 – Recognize Set Intersection and Union

OB.2 – Find the Intersection of Two Sets

OB.3 – Solve Compound Inequalities with the word ***and***

OB.4 – Find the Union of Two Sets

OB.5 – Solve Compound Inequalities with the word ***or***

Section 1.7 – Absolute Value Equations and Inequalities

OB.1 – Use the Distance Definition of Absolute Value

OB.2 – Solve Equations of the form $|ax + b| = k$, for $k > 0$

OB.3 – Solve Inequalities of the form $|ax + b| < k$ and of the form $|ax + b| > k$, for $k > 0$

OB.4 – Solve Absolute Value Equations that involve rewriting

OB.5 – Solve Equations of the form $|ax + b| = |cx + d|$

OB.6 – Solve Special Cases of Absolute Value Equations and Inequalities

Chapter 2

Section 2.1 – Linear Equations in Two Variables

OB.1 – Interpret a Line Graph
OB.2 – Plot Ordered Pairs
OB.3 – Find Ordered Pairs that satisfy a given Equation
OB.4 – Graph Lines
OB.5 – Find x- and y-intercepts
OB.6 – Graph Equations of Horizontal and Vertical Lines
OB.7 – Find the Midpoint of a Line Segment

Section 2.2 – The Slope of a Line

OB.1 – Find the Slope of a Line given Two Points on the Line
OB.2 – Find the Slope of a Line given an Equation of the Line
OB.3 – Graph a Line given its Slope and a Point on the Line
OB.4 – Determine whether Two Lines are Parallel, Perpendicular, or neither using Slope
OB.5 – Solve problems involving Average Rate of Change

Section 2.3 – Writing Equations of Lines

OB.1 – Write an Equation of a Line given its Slope and y-intercept
OB.2 – Graph a Line using its Slope and y-intercept
OB.3 – Write an Equation of a Line given its Slope and a Point on the Line
OB.4 – Write an Equation of a Line given Two Points on the Line
OB.5 – Write Equations of Horizontal and Vertical Lines
OB.6 – Write an Equation of a Line Parallel or Perpendicular to a given Line
~~*OB.7 – Write an Equation of a Line that Models Real Data*~~

Section 2.4 – Linear Inequalities in Two Variables

OB.1 – Graph Linear Inequalities in Two Variables
OB.2 – Graph the Intersection of Two Linear Inequalities
OB.3 – Graph the Union of Two Linear Inequalities

Section 2.5 – Introduction to Relations and Functions

OB.1 – Devine and Identify Relations and Functions
OB.2 – Find the Domain and Range
OB.3 – Identify Functions defined by Graphs and Equations

Section 2.6 – Function Notation and Linear Functions

OB.1 – Use Function Notation
OB.2 – Graph Linear and Constant Functions

Chapter 3

Section 3.1 – Systems of Linear Equations in Two Variables

OB.1 – Determine whether an Ordered Pair is a Solution of a Linear System
OB.2 – Solve Linear Systems by Graphing
OB.3 – Solve Linear Systems (with Two Equations and Two Variables) by Substitution
OB.4 – Solve Linear Systems (with Two Equations and Two Variables) by Elimination
OB.5 – Solve Special Systems

Section 3.2 – System of Linear Equations in Three Variables
OB.1 – Understand the Geometry of Systems of Three Equations in Three Variables
OB.2 – Solve Linear Systems (with Three Equations and Three Variables) by Elimination
OB.3 – Solve Linear Systems (with Three Equations and Three Variables) in which some of the Equations have missing Terms
OB.4 – Solve Special Systems
Section 3.3 – Applications of Systems of Linear Equations
OB.1 – Solve Geometry Problems using Two Variables
~~OB.2 – Solve Money Problems using Two Variables~~
OB.3 – Solve Mixture Problems using Two Variables
OB.4 – Solve Distance-Rate-Time Problems using Two Variables
OB.5 – Solve Problems with Three Variables using a System of Three Equations

Chapter 4
Section 4.1 – Integer Exponents
OB.1 – Use the Product Rule for Exponents
OB.2 – Define 0 and Negative Exponents
OB.3 – Use the Quotient Rule for Exponents
OB.4 – Use the Power Rules for Exponents
OB.5 – Simplify Exponential Expressions
Section 4.2 – Scientific Notation
OB.1 – Write Numbers in Scientific Notation
OB.2 – Convert Numbers in Scientific Notation to Standard Notation
OB.3 – Use Scientific Notation in Calculations
Section 4.3 – Adding and Subtracting Polynomials
OB.1 – Define and Classify Polynomials
OB.2 – Add and Subtract Polynomials
Section 4.4 – Polynomial Functions, Graphs, and Composition
OB.1 – Recognize and Evaluate Polynomial Functions
OB.3 – Add and Subtract Polynomial Functions
OB.5 – Find the Composition of Functions
Section 4.5 – Multiplying Polynomials
OB.1 – Multiply Terms
OB.2 – Multiply any Two Polynomials
OB.3 – Multiply Binomials
OB.4 – Find the Product of a Sum and Difference of Two Terms
OB.5 – Find the Square of a Binomial
OB.6 – Multiply Polynomial Functions
Section 4.6 – Dividing Polynomials
OB.1 – Divide a Polynomial by a Monomial
OB.2 – Divide a Polynomial by a Polynomial of Two or More Terms
OB.3 – Divide Polynomial Functions

Chapter 5

Section 5.1 – Greatest Common Factors and Factoring by Grouping

OB.1 – Factor out the Greatest Common Factor

OB.2 – Factor by Grouping

Section 5.2 – Factoring Trinomials

OB.1 – Factor Trinomials when the Coefficient of the Second-Degree Term is 1

OB.2 – Factor Trinomials by Grouping when the Coefficient of the Second-Degree Term is not 1

OB.3 – Factor Trinomials using the FOIL method when the Coefficient of the Second-Degree Term is not 1

OB.4 – Factor using Substitution

Section 5.3 – Special Factoring

OB.1 – Factor a Difference of Squares

OB.2 – Factor a Perfect Square Trinomial

OB.3 – Factor a Difference of Cubes* (formula provided)

OB.4 – Factor a Sum of Cubes* (formula provided)

Section 5.5 – Solving Quadratic Equations Using the Zero-Factor Property

OB.1 – Use the Zero-Factor Property

OB.2 – Solve Applied Problems that require the Zero-Factor Property

~~OB.3 – Solve a Formula for a specified Variable, where Factoring is necessary~~

Chapter 6

Section 6.1 – Rational Expression and Functions; Multiplying and Dividing

OB.1 – Define Rational Expression

OB.2 – Define Rational Functions and give their Domains

OB.3 – Write Rational Expressions in Lowest Turns

OB.4 – Multiply Rational Expressions

~~*OB.5 – Find Reciprocals of Rational Expressions*~~

OB.6 – Divide Rational Expressions

Section 6.2 – Adding and Subtracting Rational Expressions

OB.1 – Add and Subtract Rational Expressions with the same Denominator

OB.2 – Find a Least Common Denominator

OB.3 – Add and Subtract Rational Expressions with different Denominators

Section 6.3 – Complex Fractions

OB.1 – Simplify Complex Fractions by Simplifying the Numerator and Denominator

OB.2 – Simplify Complex Fractions by Multiplying by a Common Denominator

~~OB.3 – Compare the two methods of Simplifying Complex Fractions~~

OB.4 – Simplify Rational Expressions with Negative Exponents

Section 6.4 – Equations with Rational Expressions and Graphs

OB.1 – Determine the Domain of the Variable in a Rational Equation

OB.2 – Solve Rational Equations

Section 6.5 – Applications of Rational Expressions

~~OB.1 – Find the Value of an Unknown Variable in a Formula~~

OB.2 – Solve a Formula for a Specified Variable

OB.3 – Solve Applications using Proportions

OB.4 – Solve Applications about Distance, Rate, and Time

OB.5 – Solve Applications about Work Rates

Section 6.6 – Variation

OB.1 – Write an Equation Expression Direct Variation

OB.2 – Find the Constant of Variation, and Solve Direct Variation Problems

OB.3 – Solve Inverse Variation Problems

OB.4 – Solve Joint Variation Problems

OB.5 – Solve Combined Variation Problems

Chapter 7

Section 7.1 – Radical Expressions and Graphs

OB.1 – Find Roots of Numbers

OB.2 – Find Principal Roots

OB.4 – Find nth Roots of Nth Powers

~~OB.5 – Use a Calculator to find Roots~~

Section 7.2 – Rational Exponents

OB.1 – Use Exponential Notation for nth Roots

OB.2 – Define and use Expressions of the form $a^{m/n}$

OB.3 – Convert between Radicals and Rational Exponents

OB.4 – Use the Rules for Exponents with Rational Exponents

Section 7.3 – Simplifying Radicals, the Distance Formula, and Circles

OB.1 – Use the Product Rule for Radicals

OB.2 – Use the Quotient Rule for Radicals

OB.3 – Simplify Radicals

OB.4 – Simplify Products and Quotients of Radicals

OB.5 – Use the Pythagorean Theorem

OB.6 – Use the Distance Formula

~~OB.7 – Find the Equation of a Circle given its Center and Radius (also covered in 12.1)~~

Section 7.4 – Adding and Subtracting Radical Expressions

OB.1 – Simplify Radical Expressions involving Addition and Subtraction

Section 7.5 – Multiplying and Dividing Radical Expressions

OB.1 – Multiply Radical Expressions

OB.2 – Rationalize Denominators with One Radical Term

OB.3 – Rationalize Denominators with Binomials involving Radicals

OB.4 – Write Radical Quotients in Lowest Terms

Section 7.6 – Solving Equations with Radicals

OB.1 – Solve Radical Equations using the Power Rule

OB.2 – Solve Radical Equations that require additional steps (excluding Example 5)

OB.3 – Solve Radical Equations with indexes greater than 2

~~OB.4 -Use the Power Rule to Solve a Formula for a specified Variable~~

Section 7.7 – Complex Numbers

OB.1 – Simplify Numbers of the form $\sqrt{-b}$, where b > 0

OB.2 – Identify Subsets of the Complex Numbers

Chapter 8

Section 8.1 – The Square Root Property and Completing the Square

OB.1 – Review the Zero-Factor Property

OB.2 – Learn the Square Root Property

OB.3 – Solve Quadratic Equations of the form $(ax + b)^2 = c$ by extending the Square Root Property

OB.4 – Solve Quadratic Equations by Completing the Square

OB.5 – Solve Quadratic Equations with Nonreal Complex Solutions

Section 8.2 – The Quadratic Formula

~~OB.1 – Derive the Quadratic Formula~~

OB.2 – Solve Quadratic Equations using the Quadratic Formula

~~OB.3 – Use the Discriminant to Determine Number and Type of Solutions~~

Section 8.3 – Equations that Lead to Quadratic Methods

OB.1 – Solve Rational Equations that lead to Quadratic Equations

~~OB.2 – Solve Applied Problems involving Quadratic Equations~~

OB.3 – Solve Radical Equations that lead to Quadratic Equations

OB.4 – Solve Equations that are Quadratic in Form* (new)

Section 8.4 – Formulas and Further Applications

OB.2 – Solve Applied Problems Using the Pythagorean Theorem

Section 8.5 – Polynomial and Rational Inequalities

OB.1 – Solve Quadratic Inequalities

OB.2 – Solve Polynomial Inequalities of Degree 3 or greater

OB.3 – Solve Rational Inequalities

Chapter 9

Section 9.1 – Review of Operation and Composition

OB.1 – Review Operations of Functions

OB.2 – Find a Difference Quotient

OB.3 – Form Composite Functions ~~and find their Domains~~

Section 9.3 – More About Parabolas and Their Applications

OB.1 – Find the Vertex of a Vertical Parabola (as in Example 3, do not Complete the Square)

OB.2 – Graph a Quadratic Function

~~OB.3 – Use the Discriminant to Find the Number of x-intercepts~~

Chapter 10

Section 10.2 – Exponential Functions

~~OB.1 – Evaluate Exponential Expressions using a Calculator~~

OB.2 – Define and Graph Exponential Functions (excluding Example 4)

OB.3 – Solve Exponential Equations of the form $a^x = a^k$ for x

Section 10.3 – Logarithmic Functions
OB.1 – Define a Logarithm
OB.2 – Convert between Exponential and Logarithmic forms~~, and Evaluate Logarithms~~
OB.3 – Solve Logarithmic Equations of the form $\log_a b = k$ for a, b, or k
OB.4 – Use the Definition of Logarithm to Simplify Logarithmic Expressions
OB.5 – Define and Graph Logarithmic Functions
Section 10.4 – Properties of Logarithms
OB.1 – Use the Product Rule for Logarithms
OB.2 – Use the Quotient Rule for Logarithms
OB.3 – Use the Power Rule for Logarithms
OB.4 – Use Properties to write alternative forms of Logarithmic Expressions
Section 10.5 – Common and Natural Logarithms
OB.1 – Evaluate Common Logarithms using a Calculator
OB.2 – Use Common Logarithms in Applications
OB.3 – Evaluate Natural Logarithms using a Calculator
OB.4 – Use Natural Logarithms in Applications
Section 10.6 – Exponential and Logarithmic Equations; Further Applications
OB.1 – Solve Equations involving Variables in the Exponents
OB.2 – Solve Equations involving Logarithms

Chapter 11
Section 11.4 – Graphs and Applications of Rational Functions
OB.2 – Find Asymptotes of the Graph of a Rational Function
OB.3 – Graph Rational Functions (excluding Example 7 & 8)

Chapter 12
Section 12.1 – Circles Revisited~~ and Ellipses~~
OB.1 – Graph Circles
OB.2 – Write an Equation of a Circle given its Center and Radius
OB.3 – Determine the Center and Radius of a Circle given its Equation
Section 12.3 – Nonlinear Systems of Equations
OB.1 – Solve a Nonlinear System using Substitution
OB.2 – Solve a Nonlinear System with Two Second-Degree Equations using Elimination
OB.3 – Solve a Nonlinear System that requires a combination of methods
Section 12.4 – Second Degree Inequalities, Systems of Inequalities, and Linear Programming
OB.1 – Graph Second-Degree Inequalities
OB.2 – Graph the Solution Set of a System of Inequalities (excluding Example 7)

ADDITIONAL INFORMATION

For those of you new to a synchronous course there are some things to keep in mind when it comes to a virtual classroom. Be acutely aware of your microphone and camera (i.e. know if it's turned off or on at all times). For our online class I will be recording the class to make the video available for students who want to use it for reference later, but the recording will be focused on the presenter's screen and the speaker, so mostly just me unless you use your microphone during

the class. I'm also going to ask, if you're comfortable with it, that you keep your camera on during lessons because it really does help me to be able to see students during the class. Being able to see actual students helps to recreate some of the advantages of a face to face class where I can quickly gauge understanding and notice if you raise your hand to ask questions. However, I will understand if this is more than you're comfortable with and keeping your camera off will not affect you negatively, questions can always be relayed through the chat window as well.

For those of you nervous about distance learning or feeling anxious about taking math online, treating the online class as though it were meeting face to face will help get you in the proper mindset. Try to find a place away from distractions if possible and prep for class as if you were actually physically leaving your house to get to class; shower, brush your teeth, change into something appropriate, whatever routine it takes to get you in the right frame of mind.

Disruptive Behavior

Do not be disruptive. Please respect your fellow students and act accordingly.

Advice from Former Students

- Be prepared to do a lot of work and if you're just doing liberals it's okay to not take this math.
- Just do your part and keep doing your homework because the professor certainly does his part to the fullest extent.
- Focus in class and pay attention.
- Do the Pearson homework and exam reviews. You can learn from attending the online class, but without the practice to solidify what you've learned, you will not do well in this class.
- You should spend extra time trying to do practice problems to learn how to do this math.
- GO TO THE ONLINE CLASSES!!! Being in person online is easy and there is a lot of good information and discussion to be had. Don't miss out!
- Complete all the homework. Take your time, get help!
- Don't slack off it's hard to catch up. Keep up with the assignments, there are a lot of them so if you miss any it takes a long time to catch up.
- Try your best not to miss class, or else you will be lost!
- Be ready to pay attention and learn.
- Ask questions.
- Come early to class and ask questions one on one.
- Don't be afraid to ask questions.
- Don't be afraid to ask stupid questions, they aren't stupid questions if they help you learn.
- Ask the stupid questions! The other students won't laugh. Do the homework, you're going to need it on your tests.
- Do the homework to get the best preparation for the tests and understand the concepts.
- Pace yourself with the homework.
- Stay caught up with the homework.
- Do the fricken homework, or else you won't be ready for the test!
- Stay on track with the syllabus and complete what is due every week.
- Do not procrastinate and stay caught up on the homework, because once you're behind it's really hard to catch back up.
- Stay on a rigorous schedule and keep up with assignments. I would also advise that you seek out a tutor before the semester begins and to go over notes with a tutor weekly. Ask for assistance, keep the instructor in the loop, and keep an open line of communication.
- Don't take this course lightly! Make this your priority! GET YOUR TUTOR ASAP! Go to TRIO go to the math lab! Mr. Donlin is super accommodating and easy to work with BUT YOU STILL HAVE TO KNOW THE CONTENT! If you think you gonna just half @$$ it DON'T BOTHER WASTING YOUR TIME OR MONEY/SCHOLARSHIP!!! Be ready to put in work!!!

FINAL WORDS FROM THE INSTRUCTOR

“I didn’t get there by wishing for it or hoping for it, but by working for it.”

– Estée Lauder

Math is a difficult subject for many people because of the way the content stacks upon itself. For example, I cannot raise a number to a given exponent if I don't know how to multiply, I cannot multiply numbers if I don't know how to add them, and I cannot add if I don't know how to count. Every skill in math sits on a step, below that step are all the stairs of things previously learned to reach that step while above that step are the things yet to learn. Unfortunately, just like in real life, walking the stairs kinda sucks; most people would rather ride the escalator or risk the germs incubating in the elevator or, if you're like me, it would be awesome if there were someone there to just wheel you around while you sat in a comfy chair. But again, just like in real life, you'll be forced to take the stairs because machines break down and as my mother tells me, "no one is pushing your lazy ass around." Mother's love aside, I previously mentioned that math is a learned skill and as a learned skill it has much in common with playing just about any sport. Take the "Big Game" for example. How does one prepare for this event? I would assume that there would be weeks, if not months, of conditioning, training, and strategizing to maximize performance and provide the best opportunity to "take the win" as the saying goes (I'm assuming all this because I've never played "the sports" myself, I was an indoor recess kind of kid). So tying this back to math, students in a math class can expect to practice their math skills outside of class, i.e. homework. Unfortunately, the term “homework” comes with a number of negative connotations learned from way back in grade school when a task was assigned by the teacher and your primary goal was to complete such a task so you could be done with it all because you felt that you had better things to do with your time. Learning does not simply materialize from completing one task after another; rather the labor of the task is meant to hone your senses in a particular fashion and makes you stronger for having done the work. You have chosen an academic path that will push you to determine what it means for you to be successful. You need to determine how much time to put into your course work, honestly figure out when you need to practice more or have had enough, and, most importantly, when to reach out for help. Thus, onto the scene, enters me, your instructor. Consider me to be the Yoda to your Luke Skywalker, or the Mr. Miyagi to your Daniel-san. During class there is a great deal of content to cover and I can help set you up and show you the basics of how to approach each problem, but your understanding will be developed and solidified as you practice on your own, exercise your force powers, wax-on/wax-off, take the stairs if you will. I believe that just about anyone can learn the math I teach, but I also recognize the struggle of learning everything in only 15 weeks while also balancing work, family, and all manner of other responsibilities; this is the truly challenging part for most students. However, walking away with a win doesn't always come easy, just ask Luke Skywalker and Daniel-san, you can find them taking the stairs.

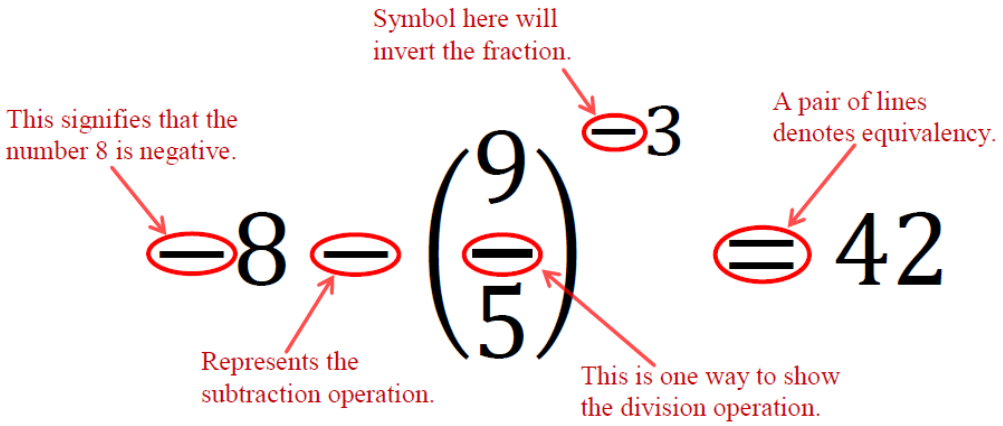
For my first wax on/wax off moment, I want you to keep two things in mind, as far as math is concerned, that are illustrated in the pictures below and on the following page:

1. The language and symbology of mathematics is exact. This is not an art class, and the positioning of numbers, letters, and the lines between them all have a purpose.
2. Much of the solution to a math problem is implied by the smallest of details and it will be up to you to bring the knowledge needed to solve these problems. This is very much unlike, for instance, an essay question, where you can sometimes extract part of your answer from the question or the way it is framed.

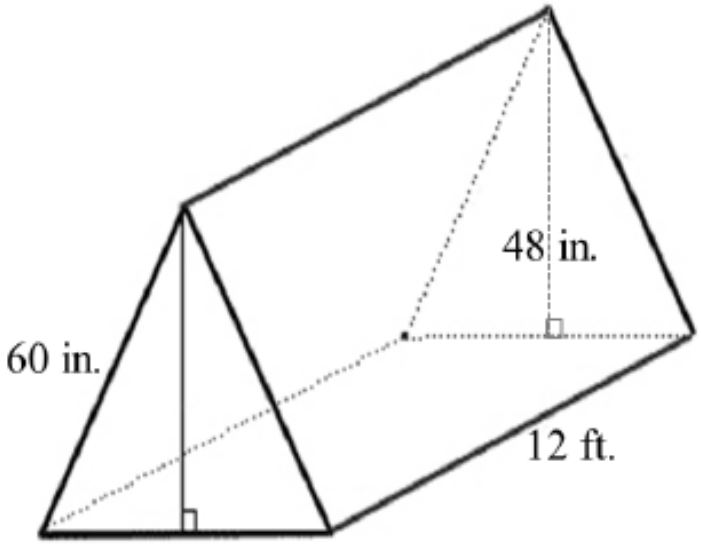
“ _ ”

What does this symbol represent?

$$-8-\left(\frac{9}{5}\right)^{-3}=42$$



How do you solve the following problem?



Find the Volume of the Prism.

$V = Bh$

There is a Right Triangle here and Pythagorean Theorem can be applied.
Leg 1 = 48 in.
Leg 2 = unknown
Hypotenuse = 60 in.

Height of the Triangle, but not Height of the Prism.

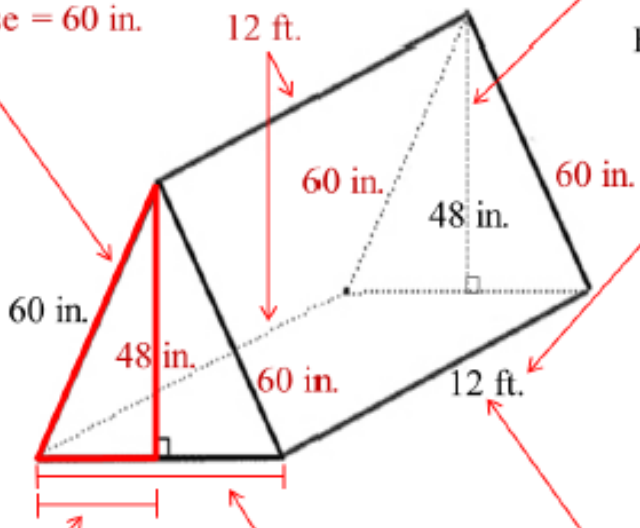
Prism is a Triangular Prism and the Base of the Prism is a Triangle.

Find the Volume of the Prism.

h = Height of the Prism (this is different from the Height of the Triangle)

$V = Bh$

B = the Area of the Base (The Base is a Triangle, so the Area Formula for a Triangle is needed: $A = \frac{bh}{2}$ where 'b' is the Base of the Triangle and 'h' is the Height of the Triangle.)



This is the Length of the Base of the Triangle and is needed to calculate the Area of the Base of the Prism.

Units here are in 'feet' but other measurements are in 'inches'. All measurements need to be converted to the same Units of Measure, either feet or inches.

Pythagorean Theorem ($a^2 + b^2 = c^2$, solve for 'a' or 'b') must be used to find this length, then multiply that value by 2 in order to find the Length of the Base of the Triangle.