



UNIVERSITY of HAWAII®  
**WINDWARD**  
COMMUNITY COLLEGE

## **MATH 103 – COLLEGE ALGEBRA**

4 Credits, CRN: 60221

MW, 5:30 pm – 7:20 pm; 8/23 – 12/17

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

**OFFICE:** None (I'm a man with no country)

**OFFICE HOURS:** MWF, 5:00 pm – 5:30 pm, 7:20 pm – 8:00 pm

**EMAIL:** donlind@hawaii.edu

**EFFECTIVE DATE:** Fall 2021

### **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 2 points per problem. These solutions will be posted on Lulima, 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:**

4 Exams (100 Points Each)	400 points	60%
MyLab Math	100 points	12.5%
Student Exemplars	108* points	12.5%
Final Exam	120 points	15.0%
Total		100%

\* This point total might vary, but percentage earned will determine how much of the 12.5% of the final

**Course Grade**

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

<u>Grade</u>	<u>Definition</u>
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: **donlin42634**

### **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: **donlin42634**, 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 - Fall 2021** 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 - Fall 2021** 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 - Fall 2021**.
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: **xxq2drr**

Laulima:

- "College Algebra" tab when logged into Laulima

### Learning Resources

- Textbook: *Lial, Hornsby, McGinnis. (2020) Algebra For College Students, 9<sup>th</sup> 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](mailto:royinouy@hawaii.edu), or you may stop by Hale Kāko‘o 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:

UH Confidential Advocate  
 Phone: (808) 348-0663  
 Email: [advocate@hawaii.edu](mailto:advocate@hawaii.edu)

Desrae Kahale, Mental Health Counselor & Confidential Resource  
 Phone: (808) 235-7393  
 Email: [dkahale3@hawaii.edu](mailto:dkahale3@hawaii.edu)  
 Office: Hale Kāko‘o 101

Karla K. Silva-Park, Title IX Coordinator  
 Phone: (808) 235-7468  
 Email: [karlas@hawaii.edu](mailto:karlas@hawaii.edu)  
 Office: Hale Kāko‘o 128

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/](http://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: Alaka'i 121
- Phone: (808) 235-7422

## COURSE CONTENT

**DONLIN – Fall 2021; MW 5:30 – 7:20 PM (CRN: 60221)**

**Academic Calendar:** <http://windward.hawaii.edu/academics/Calendar/>

August 31 – Last Day to Add/Late Register, Last Day for 100% Refund

September 14 – Last Day for 50% Refund, Last Day to Withdraw *without* a "W" Grade

November 1 – Last Day to Establish C/NC and Audit Options, Last Day to Withdraw *with* a "W"

November 6 – Donlin's Birthday

December 9 – Last Day of Instruction

December 17 – Last Day of the Fall Semester

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

Date	Class	Homework Pacing Guide
8/23	<b>Syllabus,</b> R.2 – Basic Concepts from Algebra R.4 – Exponents, Roots, and Order of Operations	
8/25	1.1 – Linear Equations in One Variable 1.5 – Linear Inequalities in One Variable 1.6 – Set Operations and Compound Inequalities 1.7 – Absolute Value Equations and Inequalities	
8/30	2.1 – Linear Equations in Two Variables 2.2 – The Slope of a Line 2.3 – Writing Equations of Lines	R.2, R.4 1.1, 1.5, 1.6, 1.7
9/1	2.4 – Linear Inequalities in Two Variables 2.5 – Introduction to Relations and Functions 2.6 – Function Notation and Linear Functions	
9/6	<i>Labor Day (No Classes)</i>	
9/8	3.1 – Systems of Linear Equations in Two Variables 3.2 – System of Linear Equations in Three Variables	2.1, 2.2, 2.3, 2.4, 2.5, 2.6
9/13	3.3 – Applications of Systems of Linear Equations	3.1, 3.2
9/15	Exam 1 Review	
9/20	<b>Exam 1 – Chapter R, 1, 2, &amp; 3</b>	3.3
9/22	4.1 – Integer Exponents 4.2 – Scientific Notation 4.3 – Adding and Subtracting Polynomials 4.4 – Polynomial Functions, Graphs, and Composition	
9/27	4.5 – Multiplying Polynomials 4.6 – Dividing Polynomials	4.1, 4.2, 4.3, 4.4
9/29	5.1 – Greatest Common Factors and Factoring by Grouping 5.2 – Factoring Trinomials 5.3 – Special Factoring	
10/4	5.5 – Solving Quadratic Equations Using the Zero-Factor Property 6.1 – Rational Expression and Functions; Multiplying and Dividing	4.5, 4.6 5.1, 5.2, 5.3
10/6	6.2 – Adding and Subtracting Rational Expressions 6.3 – Complex Fractions	
10/11	6.4 – Equations with Rational Expressions and Graphs 6.5 – Applications of Rational Expressions 6.6 – Variation	5.5 6.1, 6.2, 6.3
10/13	Exam 2 Review	

<b>10/18</b>	<b>Exam 2 – Chapter 4, 5, &amp; 6</b>	6.4, 6.5, 6.6
<b>10/20</b>	7.1 – Radical Expressions and Graphs 7.2 – Rational Exponents 7.3 – Simplifying Radicals, the Distance Formula, and Circles	
<b>10/25</b>	7.4 – Adding and Subtracting Radical Expressions 7.5 – Multiplying and Dividing Radical Expressions 7.6 – Solving Equations with Radicals 7.7 – Complex Numbers	7.1, 7.2, 7.3
<b>10/27</b>	8.1 – The Square Root Property and Completing the Square 8.2 – The Quadratic Formula 8.3 – Equations that Lead to Quadratic Methods	
<b>11/1</b>	8.4 – Formulas and Further Applications 8.5 – Polynomial and Rational Inequalities	7.4, 7.5, 7.7 8.1, 8.2, 8.3
<b>11/3</b>	Exam 3 Review	
<b>11/8</b>	<b>Exam 3 – Chapter 7 &amp; 8</b>	8.4, 8.5
<b>11/10</b>	9.1 – Review of Operation and Composition 9.3 – More About Parabolas and Their Applications	
<b>11/15</b>	10.2 – Exponential Functions 10.3 – Logarithmic Functions 10.4 – Properties of Logarithms	9.1, 9.3
<b>11/17</b>	10.5 – Common and Natural Logarithms 10.6 – Exponential and Logarithmic Equations; Further Applications	
<b>11/22</b>	11.4 – Graphs and Applications of Rational Functions 12.1 – Circles Revisited <del>and Ellipses</del>	10.2, 10.3, 10.4, 10.5, 10.6
<b>11/24</b>	12.3 – Nonlinear Systems of Equations 12.4 – Second Degree Inequalities, Systems of Inequalities, and Linear Programming	
<b>11/29</b>	Exam 3 Review	11.4 12.1, 12.3, 12.4
<b>12/1</b>	<b>Exam 4 – Chapters 9, 10, 11, &amp; 12</b>	
<b>12/6</b>	Final Exam Review	Use this time to catch up on
<b>12/8</b>	Final Exam Review	Homework and Exemplars
<b>12/13</b>	No Class (Final Exams Week)	
<b>12/15</b>	<b>Final Exam: 5:30 pm – 7:30 pm</b> Final Due Date for Homework and Exemplars: 12/15 @ 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

### **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

Section 4.2: Optional Example 4 - Using Scientific Notation to Solve Problems

Section 4.5: Move quickly as this is review. The only new concept may be the notation for Objective 6 - Multiply 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 Terms*

*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.

### **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.

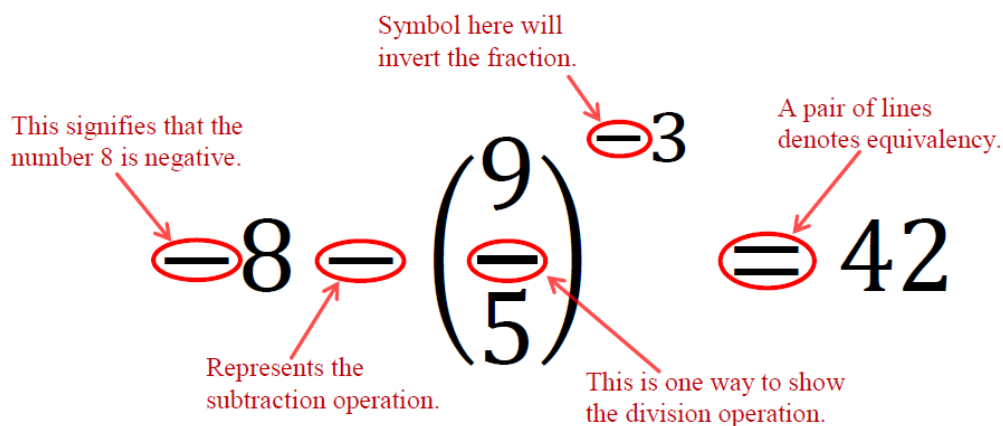
“ — ”

What does this symbol represent?

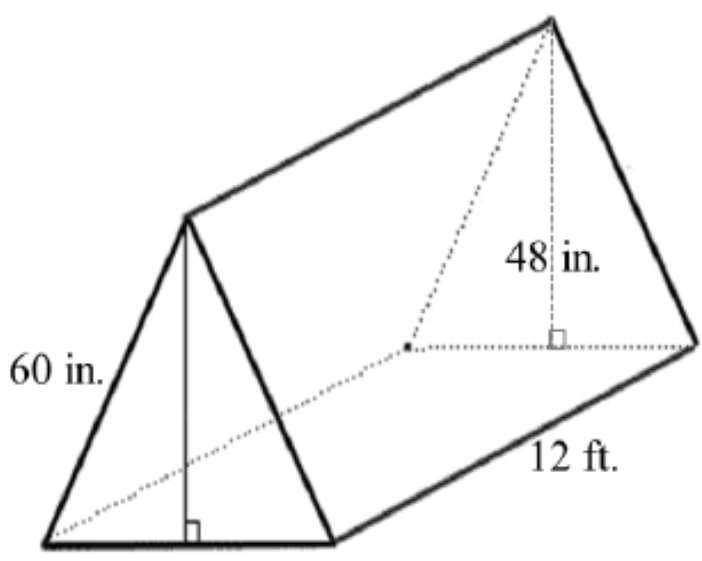
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$$-8 - \left(\frac{9}{5}\right)^{-3} = 42$$


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How do you solve the following problem?



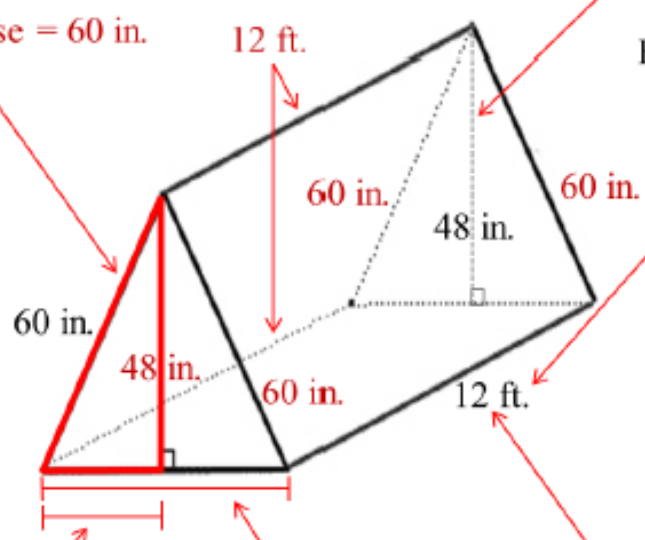
Find the Volume of the Prism.

$$V = Bh$$

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.