

Elementary Algebra Foundations MAT K095, T 5:00pm – 8:00pm

Instructor: Mr. Smith

Measurements: Tests – 100%.

Grade equivalents: A 93 – 100, A- 90 – 93, B+ 87 – 89, B 83 – 86

B- 80 – 82, C+ 77 – 79, C 73 – 76, C- 70 – 72, D+ 67 – 69, D 63 – 66

D- 60 – 62, F below 60, N if the student completed less than 60% of work

Attendance: It is very important that you attend ALL classes. Your attendance in the classroom, participation in classroom work and preparation for each class is required and is essential to your success in the course.

Support Services: TBD

Class Cancellation: You will be notified should this be necessary.

Plagiarism and Academic Honesty:

At TRCC, we expect the highest standards of academic honesty. The Board of Trustees' Proscribed Conduct Policy prohibits cheating on exams, unauthorized collaboration on assignments, unauthorized access to exams or course materials.

Homework: Homework will be started in each class, with the student completing the assignment.

Grade: Your grade for the course will be determined in the following manner: 80% of the average of your (5) test*, and 20% of your final exam grade.

*There will be (4) major exams and at least (2) quizzes. The average of Your quiz grades will represent (1) test grade.

COURSE DESCRIPTION:

This course develops understanding of number systems, different representations of numbers, and operations on numbers, including numbers expressed in scientific notation. The course introduces functions, their graphs, and modeling relationships between quantities using functions. Topics also include solving equations; simplifying expressions with integer exponents; using square roots; solving, analyzing, and modeling linear equations; and using systems of linear equations, Pythagorean Theorem, and geometric formulas to solve real world problems. This course does not satisfy a math requirement or an elective in any degree program, nor do its credits count toward graduation.

COURSE OUTCOMES:

1. Rational Numbers – At the end of this course, a student should be able to

- a) Identify and distinguish between rational and irrational numbers
- b) Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2 , $\sqrt{8}$)

2. Expressions and Equations with Polynomials, Rational and Radical Expressions, and Integer Exponents – At the end of this course, a student should be able to

- a) Interpret parts of an expression, such as terms, factors, and coefficients and evaluate expressions for a given replacement value(s)
- b) Add, subtract, and multiply polynomials. Divide polynomials by a monomial
- c) Construct and interpret equations as two expressions set equal to each other
- d) Manipulate formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's Law $V = IR$ to highlight resistance R
- e) Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = \frac{1}{3^3} = \frac{1}{27}$
- f) Use square root symbols to represent solutions to equations of the form $x^2 = p$, where p is a positive rational number
- g) Evaluate square roots of perfect squares
- h) Know that numbers such as $\sqrt{2}$ are irrational
- i) Express very large or very small quantities in scientific notation
- j) Perform operations with numbers expressed in scientific notation

3. Linear Equations in One Variable – At the end of this course, a student should be able to

- a) Solve linear equations and inequalities in one variable
- b) Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms
- c) Create linear equations and inequalities in one variable and use them to solve real world applications
- d) Recognize examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions

4. Linear Equations in Two Variables – At the end of this course, a student should be able to

- a) Interpret the rate and unit rate as the slope of the graph
- b) Derive the equation $y = mx + b$ for a line intercepting the vertical axis at b and having a slope of m
- c) Identify parallel and perpendicular lines based on their slopes
- d) Graph a linear equation in two variables
- e) Construct a linear equation to model a linear relationship between two quantities. Determine and interpret the rate of change and initial value from a description of a relationship or from two (x, y) values, including reading these from a table or graph
- f) Construct linear equations given a graph, a description of a relationship, or two input-output pairs (include reading these from a table) using point-slope form and slope-intercept form

5. Systems of Linear Equations – At the end of this course, a student should be able to

- a) Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs
- b) Solve systems of two linear equations in two variables algebraically (using both substitution and addition methods), graphically (by hand and/or technology), Solve simple cases by inspection. *For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6*
- c) Recognize systems of linear equations with one solution, infinitely many solutions, or no solutions
- d) Solve real-world problems leading to two linear equations in two variables

6. Functions – At the end of this course, a student should be able to

- a) Understand that a function is a rule that assigns to each input exactly one output and that the graph of a function is the set of ordered pairs consisting of an input and the corresponding output

- b) Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line
- c) Use functions to model linear relationships between quantities
- d) Use function notation. Evaluate functions for inputs in their domains
- e) Graph linear functions and show intercepts
- f) Recognize that linear functions have a constant rate of change and interpret the rate of change in the context of the problem

7. Applications – At the end of this course, a student should be able to

- a) Apply geometric formulas for two and three-dimensional figures such as rectangles, circles, rectangular solids, cylinders, spheres, etc.
- b) Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two dimensions

Course Objectives and Outcomes.

At the completion of MAT095, the student will be able to do the following —

Algebra

1. Use symbols and the language of algebra
2. Identify algebraic expressions
3. Use algebra to model an application
4. Evaluate an algebraic expression
5. Use linear equations to solve problems

Functions and Graphs

1. Solve applications involving geometric figures
2. Solve motion problems
3. Use two variable equations in applications
4. Plot ordered pairs
5. Determine whether a relation is a function
6. Evaluate a function
7. Determine function values from a graph

Linear Functions

1. Graph a linear equation
2. Use the intercept method to graph a linear equation
3. Write the equation of a line using the slope and the y-intercept
4. Write the equation of a line through two points
5. Construct a linear function to model an application
6. Graph a linear inequality in two variables

System of Linear Equations

1. Solve systems of equations by graphing
2. Find and interpret the intersection of two lines
3. Use the addition method to solve a system of equations
4. Use the substitute method to solve a system of equations
5. Graph and solve a system of linear inequalities

Exponents and Polynomials

1. Use exponential notation
2. Simplify exponential expressions
3. Classify, determine the degree and determine the number of terms in a polynomial
4. Add and subtract polynomials
5. Determine the product of two binomials

Radicals and Exponents

1. Evaluate expressions containing radicals
2. Apply the Pythagorean theorem
3. Use the distance formula
4. Use the product and quotient property to simplify radical expressions

COURSE OUTLINE, SCHEDULE, AND HOMEWORK ASSIGNMENTS (This is a guide only)

Ch. 0

Ch. 1 From Arithmetic to Algebra

1.1	Algebraic Expressions	p. 63	1,5,7,19,21,25,27
1.2	Evaluating Algebraic Expressions	p. 75	1-21
9/3 1.3	Simplifying Algebraic expressions	p. 87	27-67, 81-89
1.4	Solving equations using addition property	p. 102	41-61, 71-77
1.5	Solving equations using multiplication	p. 113	13-39, 59-63
9/10 1.6	Combining the rules to solve equations	p. 126	11-59, 73,75,85,87
Quiz (1-4) 1.7	Linear inequalities	p. 141	25-33, 38-55

9/17 Plus Review of ch. 1

TEST CH. 1

9/24 Plus

Ch. 2 Functions and Graphs

2.1	Formulas and problem solving	p. 161	Odd 1-21, 31-35, 37,38
2.2	Sets and set notation	p. 175	15-27, 35-43, 47, 49
9/24 2.3	Two-variable equations	p. 186	1, 7, 15, 17, 27, 33, 49
Quiz (1-3) 2.4	The Cartesian coordinate system	p. 196	1-21, 35, 39, 51
2.5	Relations and functions	p. 212	17-21, 33, 37, 41-47
10/1 2.6	Tables and graphs	p. 226	7-21, 45-49

10/8 Review of Chapter 2, Plus

TEST CH. 2

Ch. 3 Graphing linear function

3.1	Graphing linear functions	p. 256	1,3,7, 11, 21,23, 32, 33, 41,77
3.2	The slope of a line	p. 279	7-15, 19-41, 47-51, 55, 59
3.3	Linear Equations	p. 294	1,3,5,11-21,23-31,33-43

10/15
Test on
Ch. 2
Plus

Ch.4 Systems of Linear Equations

4.1 Systems of linear equations

p. 347 5 - 23, 25 - 31, 33 - 38

p. 358 1 - 9

4.3 Solving systems in 2 variables

p. 373 1-25, 33, 35, 51-55

10/29 → TEST CH. 3 AND CH. 4

Plus,

Ch. 5 Exponents and Polynomials

5.1 Positive integer exponents

p. 414 1 - 51

5.2 Integer exponents and scientific notation

p. 427 1 - 35

5.3 An introduction to polynomials

p. 436 1 - 15, 37

5.4 Adding and subtracting polynomials

p. 444 11, 17, 23, 31, 37

5.5 Multiplying polynomials

p. 455 1-19, 25-37, 49-53, 61- 67

5.6 Dividing polynomials

p. 465 1 - 19

10/19 → TEST CH. 5

Plus,

Ch.7 Radicals and Exponents7.1 Roots, radicals Pythagorean Theorem,
Solving Right Triangles

To Be Determined

11/26 ?

12/3 Course Review

12/10 FINAL EXAM

