College of Applied Science
Department of Mathematics, Physics, and Computing Technology
Center for Access and Transition

42-MATH-092 ELEMENTARY ALGEBRA II – OBJECTIVES

It will be assumed that the modules included in Elementary Algebra I (EAI) have been mastered. Faculty conducting this course may wish to do a diagnostic test or a quick review these topics the first day to make certain that students actually are good with manipulating fractions, decimals, percents, integers, equations, etc.**,** which are the main focus of EAI. Placement into EAI may be imperative for individual students who have not mastered these topics. Integration of these topics within this course's objectives is assumed.

Use of the scientific calculator is assumed. Cell phones cannot be used for a calculator on tests/quizzes or even visible during a test or quiz.

The Combining Concepts portion of the exercises should be assigned for they may provide more synthesis and critical thinking than other regular practice exercises.

Applications within any section should be assigned and demonstrated.

Module I – Miscellaneous Topics

Section 6.1 – Ratio and Proportion
- Write simplified ratios.
- Be able to solve proportions.
- Be able to apply proportions

Section 8.8 – Similar Triangles
- Find missing lengths of sides in similar triangles
- Solve applications using similar triangles and proportions.

Chapter 7 – Graphing and Introduction to Statistics

Section 7.1 – Read Pictographs, Bar Graphs, and Line Graphs

Section 7.2 – Circle Graphs
- Be able to read, construct, and convey an understanding of data using various types of graphs and know terms associated therein.

Section 7.3 – Mean, Median, and Mode
- Be able to find each of these statistical quantities, given a set of data.

Section 7.4 – Counting and Introduction to Probability
- Be able to count possible outcomes.
- Find the probability of an event.

Pattern Recognition – Pg. 286, Focus on Mathematical Connections

Chapter 9 - Equations, Inequalities, and Problem Solving.

Section 9.6 – Linear Inequalities and Problem Solving
- Use Interval notation.
- Solve linear inequalities using the addition property of inequality.
- Solve linear inequalities using multiplication property of inequality.
- Solve linear inequalities using both properties of inequality.
- Solve problem that can be modeled by linear inequalities.

Section 9.7 – Sets and Compound Inequalities
- Be able to find the intersection or union of two sets.
- Understand the significance of the terms “and” and “or”.
    - Solve compound inequalities using these terms.
- Be able to solve compound inequalities with the “and” understood.

Section 9.8 – Absolute Value Equations and Inequalities
- Know how to solve absolute value equations and inequalities. Know when they are dealing with a “special” case.
- even though all goes through OK if they understand the meaning of “and” and “or”.

Module II: Chapter 13 – Graphing Equations and Inequalities

Section 13.1 – The Rectangular Coordinate System
- Plot ordered pairs, know terms associated with the rectangular coordinate system, ***e.g.*** quadrant, axis, etc.
- Find solutions to linear equations with two variables.

Section 13.2 – Graphing Linear Equations
- Graph linear equations
    - By finding three points which satisfy the equation.
- Understand the format of a linear equation in two variables

Section 13.3 – Intercepts
- Given a graph, be able to identify *x*- & *y*-intercepts.
- Given an equation, be able to find and plot *x*- & *y*-intercepts.
- Graph a line by finding *x*- & *y*-intercepts, and a third point.
- Graph vertical and horizontal lines, know from the equation of each**,** whether it represents a vertical or horizontal line.

Section 13.4 – Slope
- Know the slope formula. Be able to find the slope of the line when given two points.
- Be able to find it when given a line’s equation.
- Know and be able to find the slope of vertical or horizontal lines**.**
- Know the slope of a line parallel or perpendicular to a given line.

Section 13.5 – Equations of Lines

- Know slope-intercept form; be able to find the equation given its slope and y-intercept.
- Graph a line by finding and using its slope and y-intercept.
- Know point-slope form of the equation of the line, and be able to use it to find the equation of a line given
    - Its slope and a point.
    - Two points on the line.
- Find equation in the context of an application.

Section 13.6 – Introduction to Functions

- Know the terms function, relation, domain, & range.
- Be able to find domain and range in simple contexts.
- Determine whether relation is a function in simple contexts. Vertical line test.
- Be able to use function notation to evaluate a function at constant values.

Section 13.7 – Graphing Linear Inequalities in Two Variables

- Know if a point is a solution or not.
- Be able to graph linear inequalities.
    - Know the significance of a dashed or solid boundary line, and how to shade appropriately.

Section 13.8 – Graphing Nonlinear Functions

- Be able to graph simple nonlinear functions. Not to be done by transformations (Shifts, reflections, etc), but by plotting points in a systematic fashion.

Module III - Chapter 14 – Systems of Equations

Section 14.1 - Solving Systems of Equations by Graphing

- Determine whether an ordered pair is a solution or not.
- Solve a linear system by graphing.
- Be able to identify inconsistent systems or dependent equations.
- Know the terms consistent, inconsistent, dependent, and independent as they relates to systems.

Section 14.2 – Solving Systems of Linear Equations by Substitution

- Know the substitution method to solve systems.
- Know that the solution consists of a set of ordered pair(s).
- Know when a system has no solution or an infinite number of solutions using the substitution method.

Section 14.3 – Solving Systems of Linear Equations by Addition

- Be able to solve a system by the addition (elimination) method.
- Know when a system has no solution or an infinite number of solutions using the elimination method. When a dependent system, students should know what solutions are appropriate.

Section 14.4 – Systems of Linear Equations and Problem Solving

- Be able to use systems to solve applications.
    - Number problems.
    - Uniform motion problems.
    - Mixture problems.

Section 14.5 – Systems of Linear Inequalities

- Be able to graph a system of linear inequalities and identify the solution region through proper shading.

Module IV – Chapter 10 – Exponents and Polynomials

Section 10.1 – Exponents

- Be able to distinguish the base and exponent in an exponential expression.
- Evaluate an exponential expression. Know the significance of parenthesis vs. no parenthesis. **(e.g.)**: -2^2 vs. $(-2)^2$ or $-x^4$, when $x = -3$.
- Know which exponent rule is appropriate when simplifying exponential expressions.
    - Power rule, product rule, quotient rule, power of a product or quotient rule, and zero exponent rule.

Section 10.2 – Negative Exponents and Scientific Notation

- Understand what a negative exponent means,
- Simplify expressions containing negative exponents.
- Know how to change negative exponents' $\leftrightarrow$ positive exponents.
- Simplify exponential expressions involving products, quotients, + or – powers, and + or – numbers.
- Know how to change numbers in standard notation $\leftrightarrow$ scientific notation.
- Be able to use exponent laws to simplify products or quotients of numbers in scientific notation.

Section 10.3 – Introduction to Polynomials

- Know what isn't a polynomial and terms connected with polynomials.
    - Term, coefficient, leading term, degree of term, degree of polynomial, descending order, monomial, binomial, & trinomial.
- Simplify polynomials by combining like terms and writing in descending order.

Section 10.4 – Adding and Subtracting Polynomials

- Be able to add or subtract (change signs and add) any polynomials. Simplify by combining like terms and write result in descending order.

Section 10.5 – Multiplying Polynomials

- Multiply monomials, monomials times polynomials, and polynomials times polynomials.
- Be able to do horizontally or vertically.

Section 10.6 – Special Products

- Multiply binomials $\times$ binomials by using FOIL.
- Be able to square binomials, and recognize that the product always results in a trinomial.

- Know that multiplying $(a+b)(a-b)$ results in the difference of two squares.

Section 10.7 – Dividing Polynomials

- Divide a monomial into a polynomial.
- Be able to do long division of a polynomial by another polynomial.

Text*:* ***Prealgebra and Introductory Algebra*** **– custom edition for U.C. by Martin-Gay, 2005**

The following progress will be general to accommodate any type of contact hours.

Week 1:
Get acquainted, test or review, and
Sections 6.1, 8.8, 7.1, 7.2, 7.3, and 7.4.

Week 2:
Sections 9.6, 9.7, 9.8 and page 286 Pattern Recognition.

Week 3:
Module I test, Section 13.1, 13.2, and 13.3

Week 4:
Sections 13.4, 13.5, and 13.6.

Week 5:
Sections 13.7 and 13.8, Module II test.

Week 6:
Sections 14.1, 14.2 and 14.3

Week 7:
Sections14.4 and 14.5, Module III test.

Week 8:
Sections 10.1, 10.2, 10.3 and 10.4.

Week 9:
Sections 10.5 and 10.6

Week 10:
Section 10.7, Module IV test, and review for Final Exam.