COURSE COMPETENCIES AND ASSESSMENTS: SENIOR MATH

COURSE DESCRIPTION:

This is a survey course, focusing primarily on the algebra skills needed to enter the work force or community colleges. Students will develop facility in simplifying and evaluating polynomial and rational expressions, as well as solve linear equations and inequalities, quadratic equations and systems of linear equations. Emphasis will be placed on applying these skills in solving real world problems.

COMPETENCIES:

1. Students will understand that algebra is the language through which much of mathematics, science, and technology are communicated.

2. Students will understand that patterns, relations, and functions can be used to describe, interpret, and predict real world phenomena.

3. Students will understand that models can be used to represent and understand quantitative relationships.

4. Students will understand that tables, graphs, and equations are ways for depicting and analyzing patterns of change in data.

5. Students will understand that symbolic statements can be manipulated by mathematical rules to produce equivalent statements.

TARGETED KNOWLEDGE:

1. Students will be able to demonstrate fluency in computing with fractions, decimals, percents, signed numbers, and square roots.

2. Students will be able to simplify and evaluate algebraic expressions by applying the order of operations and the rules of exponents

3. Students will be able to solve multi-step equations and apply this skill to formulas.

4. Students will be able to solve and graph systems of linear equations/inequalities in two variables.

5. The student will be able to simplify polynomial and rational expressions.

6. Students will be able to solve quadratic equations by: factoring, the quadratic formula, or graphing.

TARGETED SKILLS:

1.1 Students will add, subtract, multiply, and divide whole numbers, decimals, and fractions.
1.2 Students will identify place values and round decimals.
1.3 Students will identify common denominators, rewrite fractions with common denominators, reduce fractions, convert mixed numbers to improper fractions, convert improper fractions to mixed numbers, and simplify mixed numbers.
1.4 Students will convert fractions to decimals, decimals to fractions, decimals to percents, percents to decimals, percents to fractions, and fractions to percents.
1.5 Students will solve word problems containing work related problems, sales, discounts, taxes, percents, and percent increase and decrease.

2.1 Students will simplify expressions using order of operations.
2.2 Students will evaluate expressions for a given value.
2.3 Students will translate sentences into expressions or equations.
2.4 Students will solve one-step, two-step, and multi-step equations. The skills include: combining like terms, applying the distributive property, and moving variables to alternate sides.

3.1 Students will solve one-step equations.
3.2 Students will solve two-step equations.
3.3 Students will solve multi-step equations including: combining like terms, distributive property and variables on both sides.
3.4 Students will solve inequalities.
3.5 Students will solve absolute value equations.
3.6 Students will solve absolute value inequalities.

4.1 Students will solve systems of linear equations by graphing, substitution, or addition.
4.2 Students will solve word problems using a system of linear equations.
4.3 Students will solve systems of linear inequalities by graphing.

5.1 Students will simplify polynomial expressions using addition, subtraction, and multiplication.
5.2 Students will simplify rational expressions using addition, subtraction, multiplication, and common denominator.
5.3 Students will solve equations containing rational expressions.
5.4 Students will solve problems using variation and proportion.
5.5 Students will simplify complex fractions.

6.1 Students will solve quadratic equations by factoring.
6.2 Students will solve quadratic equations by completing the square.
6.3 Students will solve quadratic equations by the square root method.
6.4 Students will solve quadratic equations by using the quadratic formula.
6.5 Students will solve quadratic equations with complex solutions.
6.6 Students will solve quadratic equations by graphing.
6.7 Students will change quadratic equations from general form to vertex form.

STUDENT LEARNING EXPECTATIONS:

The student will demonstrate:

1. Effective Communication
2. Effective Use of Knowledge
3. Effective Problem Solving

SENIOR MATH
SUMMATIVE PERFORMANCE ASSESSMENT #1

Scenario:

Suppose you are a landscaper. You are landscaping a public park and have just put in a flower bed measuring 8 feet by 12 feet. You would also like to surround the bed with a decorative floral border consisting of low-growing, spreading plants. Each plant will cover approximately 1 square foot when mature, and you have 224 plants to use. How wide of a strip of ground should you prepare around the flower bed for the border?

[a] Draw and label a diagram for the scenario.
[b] State the equation to use for solving the problem.
[c] Solve the equation and explain your solution.

Competency Addressed:

1. Students will understand that algebra is the language through which much of mathematics, science, and technology are communicated.

2. Students will understand that patterns, relations, and functions can be used to describe, interpret, and predict real world phenomena.

3. Students will understand that models can be used to represent and understand quantitative relationships.

4. Students will understand that tables, graphs and equations are ways for depicting and analyzing patterns of change in data.

5. Students will understand that symbolic statements can be manipulated by mathematical rules to produce equivalent statements.

Targeted Knowledge Addressed:

2. Students will be able to simplify and evaluate algebraic expressions by applying the order of operations and the rules of exponents.

3. Students will be able to solve multi-step equations and apply this skill to formulas.

6. Students will be able to solve quadratic equations by: factoring, the quadratic formula, or graphing.

Targeted Skills Addressed:

2.1 Students will simplify expressions using order of operations.
2.2 Students will evaluate expressions for a given value.
2.3 Students will translate sentences into expressions or equations.
2.4 Students will solve one-step, two-step, and multi-step equations. The skills include: combining like terms, applying the distributive property, and moving variables to alternate sides.

3.3 Students will solve multi-step equations including: combining like terms, distributive property and variables on both sides.

6.1 Students will solve quadratic equations by factoring.
6.2 Students will solve quadratic equations by completing the square..
6.4 Students will solve quadratic equations by the using the quadratic formula.
6.6 Students will solve quadratic equations by graphing.

Students Learning Expectation Addressed:

1. Effective Communication
2. Effective Use of Knowledge
3. Effective Problem Solving

RUBRIC SENIOR MATH SPA #1	

Level 4	**Level 3**	**Level 2**	**Level 1**
The student creates and labels the correct diagram to represent the scenario. The equation used for solving the equation is clearly stated. The equation is solved and the solution is thoroughly explained.	The student creates and labels the correct diagram to represent the scenario. The equation used for solving the equation is clearly stated. The equation is solved but the solution is not thoroughly explained.	The student creates and labels the correct diagram to represent the scenario. The equation used for solving the equation is clearly stated but it is not solved or thoroughly explained.	The student creates and labels the correct diagram to represent the scenario.

SENIOR MATH
SUMMATIVE PERFORMANCE ASSESSMENT #2

Scenario:

A rocket is launched from the top of an 80 foot cliff with an initial velocity of 120 ft/second. The height, h, of the rocket after t seconds is given by the equation $h = -16t^2 + 120t + 80$.

[a] Graph an appropriate representation of the path of the rocket.

[b] How long after the rocket is launched will it be 30 feet from the ground? (round to the nearest tenth of a second)

[c] At what time will the rocket reach its maximum height? What is its maximum height?

[d] How long after the rocket is launched will it strike the ground?

Competency Addressed:

1. Students will understand that algebra is the language through which much of mathematics, science, and technology are communicated.

2. Students will understand that patterns, relations, and functions can be used to describe, interpret, and predict real world phenomena.

3. Students will understand that models can be used to represent and understand quantitative relationships.

4. Students will understand that tables, graphs, and equations are ways for depicting and analyzing patterns of change in data.

5. Students will understand that symbolic statements can be manipulated by mathematical rules to produce equivalent statements.

Targeted Knowledge Addressed:

6. Students will be able to solve quadratic equations by: factoring, the quadratic formula, or graphing.

Targeted Skills Addressed:

6.1 Students will solve quadratic equations by factoring.
6.4 Students will solve quadratic equations by the quadratic formula.
6.6 Students will solve quadratic equations by graphing.
6.7 Students will change quadratic equations from general form to vertex form.

Students Learning Expectation Addressed:

1. Effective Communication
2. Effective Use of Knowledge
3. Effective Problem Solving

RUBRIC SENIOR MATH SPA #2	

Level 4	Level 3	Level 2	Level 1
The student creates the correct graph on a coordinate plane to represent the situation. The vertex and the x & y intercepts are labeled correctly. The correct equation is written for the path of the rocket in vertex form. All work is shown and presented in a manner that is easily understood.	The student creates the correct graph on a coordinate plane to represent the situation. The vertex and the x & y intercepts are labeled correctly. The student is able to begin to find the path of the rocket but is unable to find it in vertex form. Work is not organized logically or in a manner that is easily followed.	The student creates the correct graph on a coordinate plane to represent the situation. The vertex and the x & y intercepts are labeled correctly. The student is unsure how to find the correct vertex form.	The student creates the correct graph on a coordinate plane to represent the situation. The student is unable to find the correct coordinates of the vertex and x & y intercepts.

Recommended Textbook

Title: Beginning Algebra
Authors: K. Elayn Martin-Gay
Release: 2003-06-30
Publisher: Pearson Prentice Hall
Format: Hardcover
Reading Level: Young Adult
ISBN: 0131918427 **ISBN 13**: 9780131918429
Edition: 4th (a 5th edition is now available)