MATH 080 – FOUNDATIONAL MATH ACCELERATOR | 3 CREDITS

SYLLABUS

CATALOG DESCRIPTION

In this self-paced course, students utilize computer-assisted learning and individual instruction to prepare for college level math courses. This course if offered as an alternative to traditional developmental math courses. When completing this course, students will retest their math skills using the Accuplacer to determine placement into higher levels of math. This course is available to students who place into MATH 095, 096, or 115, but does not replace any of these courses.

Prerequisites: Appropriate Accuplacer score

Semester Offered: Fall and Spring

Common Student Learning Outcomes

Upon successful completion of San Juan College programs and degrees, the student will demonstrate competency in…

BROAD AND SPECIALIZED LEARNING

Students will actively and independently acquire, apply, and adapt skills and knowledge with an awareness of global contexts.

CRITICAL THINKING

Students will think analytically and creatively to explore ideas, make connections, draw conclusions and solve problems.

CULTURAL AND CIVIC ENGAGEMENT

Students will act purposefully, reflectively, and ethically in diverse and complex environments.

EFFECTIVE COMMUNICATION

Students will exchange ideas and information with clarity in multiple contexts.

INFORMATION LITERACY

Students will be able to recognize when information is needed and have the ability to locate, evaluate, and use it effectively.

INTEGRATING TECHNOLOGIES

Students will demonstrate fluency in the application and use of technologies in multiple contexts.

Student work from this class may be randomly selected and used anonymously for assessment of course, program, and/or institutional learning outcomes. For more information, please refer to the Dean of the appropriate School.

Course Learning Outcomes for Tier-1 Students (~MATH 095)

Upon successful completion of the course, the student will be able to…

1. Real Numbers
2. Geometry and Measurement
3. Ratio, Proportion and Percent
4. Calculator Usage

Specific Learning Outcomes

Upon successful completion of the course, the student will be able to…

1.1 perform operations (addition, subtraction, multiplication, division and exponentiation) with decimals whole numbers, signed numbers and fractions
1.2 understand prime factorization
1.3 find the least common multiple and greatest common factor of any set of numbers
1.4 recognize when and how to estimate and approximate whole numbers, fractions and decimals to approximate values
1.5 correctly apply the order of operations to any set of numbers
1.6 know the commutative, associative and distributive laws
1.7 manipulate simple algebraic expressions and solve linear equations
1.8 truncate and round numbers
1.9 locate points corresponding to any number on the real number line
1.10 recognize when to estimate, approximate or compute exact values
1.11 apply the rules for simplifying expressions

2.1 articulate the significance of and need for units of measurement
2.2 work with both metric and US units of measurement, including performing conversions within each system and from one system to the other
2.3 calculate the perimeter of a polygon or circumference of a circle
2.4 explain the concepts of points, lines, planes, angles, and parallel and perpendicular lines to include units of measure
2.5 measure angles
2.6 recognize and name the various types of polygons
2.7 find the area, volume, and surface area of various two and three-dimensional figures to include units of measure
2.8 calculate, use and simplify squares and square units
2.9 articulate the significance of and wide variety of uses of the Pythagorean Theorem and demonstrate the ability to use the Pythagorean Theorem
2.10 know the value of pi

3.1 set ratios and understand what they represent
3.2 calculate rates and unit pricing
3.3 set up and solve proportions, including similar triangles
3.4 set up and solve variation problems
3.5 know how to compute percents, convert numbers to percents and percents to numbers
3.6 model applications requiring percents
3.7 calculate percent of change
3.8 calculate discounts, commissions and simple interest

4.1 using the calculator, perform operations involving order of operations agreement, exponentiation and roots of number

Additional specific requirements for Tier 1 Students: A basic scientific calculator is required; however scientific calculators will not be allowed on some coursework and exams. Students must be able to demonstrate mastery of all operations on rational numbers without the use of calculators. We highly recommend the student use a TI-30IIX, Texas Instruments calculator.

COURSE LEARNING OUTCOMES FOR TIER-2 STUDENTS (~MATH 096)

Upon successful completion of the course, the student will be able to…

1. Algebraic Expressions and Equations
2. Equations, Inequalities and Problem Solving
3. Graphs and Functions
4. Solving Systems of Linear Equations
5. Exponents and Polynomials
6. Factoring Polynomials

SPECIFIC LEARNING OUTCOMES

Upon successful completion of the course, the student will be able to…

1.1 translate a verbal/written model to an algebraic model
1.2 evaluate algebraic expressions
1.3 manipulate algebraic expressions using commutative, associative, and distributive laws
1.4 add, subtract, multiply, and divide real numbers
1.5 define absolute value geometrically and algebraically
1.6 simplify algebraic expressions using the order of operations
1.7 perform operations on exponential expressions

2.1 solve linear equations
2.2 manipulate algebraic formulas
2.3 solve real-world percent problems
2.4 solve word problems using linear equations
2.5 graph linear inequalities
2.6 solve linear inequalities and describe the solution set graphically and with interval notation
2.7 translate and solve word problems using linear inequalities

3.1 analyze graphs and tables
3.2 identify the components of the rectangular coordinate system
3.3 plot ordered pairs
3.4 graph linear equations
3.5 visualize and compute rates and slopes from graphical, numerical, and algebraic representations
3.6 know the standard, point-slope, and slope-intercept representations of a line
3.7 recognize and convert linear functions from numerical, graphical, and algebraic representations
3.8 identify functions from multiple representations and determine their domain and range

4.1 solve systems of equations in two unknowns by algebraic methods
4.2 solve systems of equations in three unknowns by algebraic methods
4.3 solve word problems using systems of equations

5.1 simplify exponential expressions using the rules of exponents
5.2 identify coefficients, terms, factors, and degrees of polynomials
5.3 add, subtract, multiply and divide polynomials
5.4 use rules for special products
5.5 convert numbers between standard and scientific notation
5.6 perform operations using scientific notation

6.1 factor monomials
6.2 factor trinomials

6.3 factor perfect-square trinomials and difference of squares
6.4 factor a sum or difference of cubes
6.5 solve polynomial equations by factoring
6.6 solve word problems involving polynomials

Additional specific requirements of Tier 2 Students: A scientific calculator is required. Graphing calculators are not allowed on exams or the department final. We highly recommend the student use a TI30IIX Texas Instruments calculator.

Course Learning Outcomes for Tier 3 Students (~MATH 115)

General Learning Outcomes:

Upon successful completion of the course, the student will be able to…

1. Rational expressions and equations
2. Functions and their graphs.
3. Inequalities and absolute value equations.
4. Radical expressions, equations, and complex numbers
5. Quadratic functions and equations
6. Exponential and logarithmic functions.

Specific Learning Outcomes:

Upon successful completion of the course, the student will be able to…

1.1 Find the domain of a rational function.
1.2 Simplify rational expressions.
1.3 Evaluate rational functions.
1.4 Multiply and divide rational expressions.
1.5 Add and subtract rational expressions.
1.6 Solve rational equations including proportions.
1.7 Solve applications involving rational equations.
1.8 Simplify complex fractions.

2.1 Graph linear equations.
2.2 Find linear functions based on various types of given information.
2.3 Evaluate and graph nonlinear functions, including piecewise functions.
2.4 Sketch graphs of functions using transformations.
2.5 Find equations of direct, inverse, joint, and combined variation.

3.1 Find the union and intersection of two sets.
3.2 Solve compound inequalities. Describe their solutions sets graphically and using interval notation.
3.3 Solve linear absolute value equations and inequalities.
3.4 Graph linear inequalities in two variables, including systems of linear inequalities.

4.1 Simplify radical expressions.
4.2 Evaluate radical functions.
4.3 Find the domain of a radical function.

4.4 Graph radical functions.
4.5 Convert radical expressions to rational exponent expressions and vice versa.
4.6 Perform algebraic operations on expressions written as radicals or as rational exponents.
4.7 Find the distance and midpoint between two points.
4.8 Add, subtract, and multiply radical expressions.
4.9 Rationalize denominators and numerators of radical expressions.
4.10 Solve radical equations.
4.11 Solve applications involving radical equations, including the Pythagorean Theorem.
4.12 Simplify expressions with square roots of negative numbers by rewriting as complex numbers.
4.13 Simplify expressions with powers of i.
4.14 Add, subtract, multiply, and divide complex numbers.

5.1 Solve quadratic equations by using an appropriate method including: factoring, principle of square roots, completing the square, and the quadratic formula.
5.2 Solve equations reducible to a quadratic equation.
5.3 Solve polynomial inequalities.
5.4 Graph a quadratic function including the vertex, and all intercepts.
5.5 Solve applications involving quadratic equations, including optimization problems.

6.1 Add, subtract, multiply, and divide functions, specifying any restrictions on the domain.
6.2 Find and evaluate composite functions.
6.3 Determine if a function is one-to-one from a set of ordered pairs and graphically.
6.4 Find the inverse of a one-to-one function.
6.5 Graph a function and its inverse on the same set of axes.
6.6 Graph and evaluate exponential and logarithmic functions.
6.7 Convert a logarithmic expression to an exponential expression and vice versa.
6.8 Use the properties of logarithms to expand or condense logarithmic expressions.
6.9 Know the common and natural base logarithms and use the change-of-base formula to evaluate logarithmic expressions.
6.10 Solve exponential and logarithmic equations and applications.

Additional specific requirements of Tier 3 Students: A scientific calculator is required. Graphing calculators are not allowed on exams or the department final. We highly recommend the student use a TI30IIX Texas Instruments calculator.