MAT 1033 – INTERMEDIATE ALGEBRA

Catalog Description:
(3) (CC). Three hours lecture per week. Prerequisite: MAT 0024 or equivalent. This course meets Area II for A.A.S. general education requirement. This course includes an introduction to functions, the study of real numbers, linear and quadratic equations, linear inequalities, systems of linear equations, exponents, polynomials, factoring, rational expressions and related equations, radicals, quadratic formula, completing the square, complex numbers, graphing and applications.

Performance Standards:
Upon successful completion of this course, the student should be able to:

1. Simplify rational expressions.
2. Find common denominators of rational expressions.
3. State the domain of a rational function.
4. Add, subtract, multiply, and divide rational polynomial expressions.
5. Factor polynomials (Factor out the greatest common factor, factor trinomials, factor the difference of two squares and the sum and difference of two cubes, and factor by grouping).
7. Solve equations and inequalities involving a single variable.
8. Solve application problems involving equations of a single variable.
9. Interpret graphs.
10. Use Cartesian coordinate system to graph linear equations in two variables.
11. Find the slope of a line.
12. Solve for one variable in terms of others (formulas).
13. Express linear equations in the slope-intercept, point-slope, and standard forms.
15. Solve linear systems of equations by graphical, substitution, and addition methods (solve two equations and two unknowns).
17. Rationalize denominators.
18. Evaluate square roots.
19. Add, subtract, multiply, divide and simplify square roots.
20. Solve application problems involving radicals.
21. Perform fundamental operations with higher order roots and write as rational exponents.
22. Solve quadratic equations by factoring, taking square roots, completing the square and using the quadratic formula.
23. Solve application problems involving quadratic equations.
24. Define and use the symbol i to take the square root of a negative number.
25. Express complex numbers in the form a + bi.
26. Add, subtract, multiply, and divide complex numbers.
27. Find the conjugate of a complex number.
28. Solve equations containing radicals.
29. Recognize functions.
30. Evaluate functions.
1. Factor: \(8x^3 + y^3\)
2. Solve: \(2x + 3 = 3x^2\)
3. Solve: \(\frac{1}{5-x} + \frac{1}{5+x} = \frac{9}{25-x^2}\)
4. Simplify: \(\frac{20y^2 - 45}{10y^2 - 5y - 15}\)
5. Simplify: \(\frac{1}{x} + \frac{2}{y}\)
6. Add: \(\frac{1}{x} + \frac{2}{x-3}\)
7. Simplify (assume all variables are nonnegative): \(\sqrt[3]{48a^7b^5c^3}\)
8. Add: \(\sqrt{48} - 3\sqrt{27} + 2\sqrt{75}\)
9. Divide: \(\frac{2 + 3i}{3 - 4i}\)
10. Find the slope of the line: \(2x - 5y = 12\)
11. Solve the system of inequalities by graphing: \(y \leq -\frac{2}{3}x + 5\) \(y > 2x + 1\)
12. Give the slope-intercept form of the equation of the line with slope = -3 and passing through the point (-2, 6).
13. Solve the system: \(3x - 2y = -8\) \(-2x + 3y = 7\)
14. Solve for \(h\): \(P = 2b + 2h\)
15. An object is thrown downward with an initial velocity of 5 feet per second. The relationship between the distance it travels \(s\) and time \(t\) is given by \(s = 5t + 16t^2\). How long does it take the object to fall 74 feet?
16. How many gallons of 20% alcohol solution and 50% alcohol solution must be mixed to get 9 gallons of 30% alcohol solution?