UNIT 1 - DISTANCE, CIRCLES, LINES, SYSTEMS, & MATRICES

Unit One Objectives

1. Use the distance formula to find both exact and approximate values for distance when given the coordinates of two points.
2. Use the midpoint formula relationship to find the coordinates of the midpoint for two given points.
3. Graph equations by plotting points and by finding intercepts.
4. Find the missing coordinate to fit the graph of a given equation when given either the x or y coordinate.
5. Write the equation of a line given two points.
6. Write the equation of a line parallel or perpendicular to a given line through a given point.
7. Write the equations of horizontal or vertical lines.
8. Given the general form of the equation of a circle, use the technique of completing the square to find the center and radius.
9. Given an equation for a line or a circle, be able to sketch the graph.
10. Solve a system of linear or non-linear equations in two variables by substitution or elimination.
11. Write the solution to a dependent system in terms of one of the variables.
12. Define variables and use systems of linear equations to solve application problems.
13. Use matrix row operations to solve systems of linear equations.

UNIT 2 - FUNCTIONS & THEIR GRAPHS

Unit Two Objectives

1. Use function notation to evaluate functions.
2. Use an equation to determine the x- and y-intercepts of a function.
3. Find the domain (given an equation or graph) and range (given a graph) of a function.
4. Describe domains and ranges using interval notation.
5. Form the sum, difference, product, and quotient of two functions.
6. Evaluate and simplify the difference quotient format.
7. Use function notation to describe or express a given relationship.

8. Analyze the graph of a function. e.g. increasing, decreasing, constant intervals; local maximum/minimum; domain/range; intercepts
9. Recognize equations and graphs of basic functions and describe their characteristics.
10. Graph a piecewise defined function.
11. Given a sketch of a function, make a sketch of a designated transformation (e.g. Given a graph of $f(x)$, sketch $g(x) = f(x-4)+3$
12. Given a description of a transformation, or series of transformations, of a basic function, sketch the graph.
13. Write the equation of a transformation, given the graph or description.

UNIT 3 - LINEAR, QUADRATIC & POLYNOMIAL FUNCTIONS

Unit Three Objectives

1. Determine the point(s) of intersection for two functions by graph or by calculation.
2. Solve linear inequalities in two variables by reading a graph.
3. Solve applications involving linear functions.
4. Find the constant of variation k and solve applications involving direct, inverse, and/or joint variation.
5. Find the real or complex zeros of quadratic functions by the methods of factoring, taking square roots, completing the square, or using the quadratic formula.
6. Use u-substitution to transform functions into quadratic form to find the zeros.
7. Use the standard form $f(x) = a(x-h)^2 + k$ of a quadratic function to sketch the graph by transformations.
8. Use the vertex, axis of symmetry, and intercepts to graph a quadratic function.
9. Identify the range for a quadratic function by examining the graph.
10. Find the maximum or minimum of a quadratic application algebraically.
11. Find a quadratic function given the vertex and one additional point on the graph.
12. Solve applications involving quadratic functions.
13. Use the leading coefficient test to determine the end behavior of the graphs of polynomial functions.
14. Identify multiplicities of polynomial zeros and determine if the graph touches or crosses at the zeros.
15. Use synthetic division with polynomials with the divisor in the form $(x-r)$.

16. Use long division with polynomials.
17. Identify the potential rational zeros of a polynomial function.
18. Use the remainder, factor, and rational zeros theorems to find zeros of polynomial functions.
19. Determine if a given binomial is a factor of a given polynomial.
20. Find all the real and complex zeros for a polynomial function.
21. Use a complex zero to find the remaining zeros of a polynomial function.
22. Use a sign test and graph to solve quadratic and polynomial inequalities.

UNIT 4 - EXPONENTIAL & LOGARITHMIC FUNCTIONS

Unit Four Objectives

1. Form compositions of functions and evaluate for a specific value of the variable.
2. Determine two functions that form a given composition.
3. Find the inverse of a given function algebraically.
4. Identify the domain and range for a function and its inverse. Know the relationship.
5. Graph a function and/or its inverse.
6. Graph the transformation of an exponential or logarithmic function and identify key characteristics (asymptotes, zeros, intercepts)
7. Use the change of base formula to evaluate logarithmic expressions on a calculator.
8. Use the properties of logarithms to write a logarithmic expression as a sum, difference, and/or product of simpler expressions (expand).
9. Use the properties of logarithms to write the sum, difference, and/or product of logarithms as a single logarithm (condense).
10. Solve equations involving exponential or logarithmic expressions.
11. Present solutions in exact form as well as approximate results.
12. Solve compound interest applications for both countable and continuous applications.
13. Find the rate of growth or decay.
14. Solve applications involving continuous growth or decay.

Formulas will be given on the exam. Students do not need to memorize just recognize. Of course, understanding the relationships among all the *letters* is very important!

UNIT 5 - RATIONAL FUNCTIONS

Unit Five Objectives
Information from Unit 5 will be assessed on the Final Exam.

1. Find the intercepts and asymptotes (vertical, horizontal, and oblique) for a given rational function.
2. Analyze a rational function and use the information to make a careful hand drawn sketch.
3. Determine if the graph of a rational function has any holes or intersects a horizontal or oblique asymptote.
4. Use a sign test to solve rational inequalitites.