

**J. Sargeant Reynolds Community College
Course Content Summary**

Course Prefix and Number: MTE 9

Credits: 1

Course Title: Functions, Quadratic Equations, and Parabolas

Course Description (as it should appear in the catalog)

Includes an introduction to functions in ordered pair, graph, and equation form. Also introduces quadratic functions, their properties and their graphs. Credits not applicable toward graduation. Prerequisite: placement recommendation or MTE 8. Lecture 4 hours per week for ¼ semester.

General Course Purpose

This course is designed to introduce the student to functions and quadratics and to give them tools for understanding their properties.

Course Objectives (Each item should complete the following sentence.)

Upon completing the course, the student will be able to:

1. Determine if a list of ordered pairs, graph, or equation is a function.
2. Determine the domain and range of a function given as a list of ordered pairs.
3. Determine the domain and range of a function given as a graph or an equation.
4. Evaluate $y = f(x)$ for constant values of x and for specific monomials and binomials.
5. Find the roots of quadratic equations of the form $ax^2 + c = 0$
6. Find the roots of quadratic equations of the form $ax^2 + bx + c = 0$ when the discriminant is a positive perfect square, positive but not perfect square, zero, or negative.
7. Describe the roots of a quadratic based upon the discriminant in all cases.
8. Write a quadratic function in vertex form $y = a(x - h)^2 + k$ by completing the square for quadratics.
9. Find the vertex of a quadratic equation $y = ax^2 + bx + c$ using the formula method $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$
10. Determine whether the parabola opens upward or downward.
11. Plot the vertex of the parabola.
12. Determine the axis of symmetry for the parabola.
13. Plot the x - and y - intercepts of the parabola and complete the graph with additional points as needed.
14. Solve problems involving area optimization.
15. Solve problems involving revenue optimization.
16. Solve problems involving the motion of falling objects.

Major Topics to be Included

1. Functions
2. Domain and Range
3. Roots of Quadratics
4. Features of Parabolas
5. Vertex form of Quadratics
6. Applications from geometry, economics, applied physics and other disciplines

Effective Date of Course Content Summary (Month, Date Year): January 2, 2012