Vocational Mathematics 1
Course Outcome Summary

Course Information

Organization	Madison Area Technical College
Developers	Al Lehnen
Development Date	4/24/2000
Revised Date	4/24/2000
Course Number	31-804-379
Instructional Level	One or Two-Year Technical Diploma
Potential Hours of Instruction	34
Total Credits	1

Description
A review of basic mathematics that consists of an introduction to using a scientific calculator, order of operations, fractions, decimals, use of percentage, units of measurement including the metric system, the reading of analog instruments for length measurement, and practical plane geometry.

Types of Instruction

Instruction Type	Contact Hours	Credits
Classroom Presentation	34	1

Textbooks
---. *Current information on texts is available from syllabi filed in the Arts & Sciences Office*.

Learner Supplies
A scientific calculator . **Manufacturer:** ---.

Prerequisites
Basic Algebra (77-854-793) or appropriate placement score

Exit Learning Outcomes
Core Abilities
A. Critical thinking
B. Mathematics

Competencies
Unit 1. Use of a Scientific Calculator

A. Perform basic mathematical operations

Competence will be demonstrated:

A.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

A.1. you perform addition applied to whole numbers

A.2. you perform subtraction applied to whole numbers

A.3. you perform multiplication applied to whole numbers

A.4. you perform division applied to whole numbers

A.5. you perform exponentiation applied to whole numbers

A.6. you perform combinations of these operations applied to whole numbers according to the standard order of operation rules

A.7. you recognize explicit grouping symbols in performing calculations

A.8. you use explicit grouping symbols in performing calculations

A.9. you recognize implicit grouping symbols (fraction bar, radical symbol, etc) in performing calculations

A.10. you use implicit grouping symbols (fraction bar, radical symbol, etc) in performing calculations

A.11. you use a scientific calculator to compute expressions that involve addition, subtraction, multiplication, division, exponentiation or combinations of these according to the standard order of operation rules

B. Apply basic mathematical operations in solving word problems

Competence will be demonstrated:

B.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

B.1. you translate a verbally stated problem into performing an equivalent computation

B.2. you interpret the computed answer to a word problem

B.3. you check the reasonableness of a computed answer to a word problem

Unit 2. Fractions

A. Perform basic mathematical operations with fractions

Competence will be demonstrated:

A.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

A.1. you determine if fractions are equivalent

A.2. you compare the magnitude of different fractions

A.3. you express improper fractions as mixed numbers and vice versa

A.4. you reduce fractions to lowest terms

A.5. you perform multiplication, division, addition, subtraction, or combinations of these operations with fractions according to the standard order of operations

A.6. you use a scientific calculator to check calculations involving fractions

A.7. you use a scientific calculator to enter calculations involving fractions

B. Use fractions in solving word problems

Competence will be demonstrated:

B.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

B.1. you translate a verbally stated problem into performing an equivalent computation involving fractions

B.2. you interpret the computed answer to a word problem

B.3. you check the reasonableness of a computed answer to a word problem

Unit 3. Decimal Fractions

A. Perform basic mathematical operations with decimal numbers

Competence will be demonstrated:

A.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

A.1. you convert fractions into decimals

A.2. you convert terminating decimals into fractions

A.3. you perform addition, subtraction, multiplication, division, exponentiation, root taking or combinations of these operations with decimal numbers according to the standard order of operation rules

A.4. you recognize signed decimal numbers

A.5. you use signed decimal numbers

A.6. you recognize decimal numbers expressed in scientific notation

A.7. you use decimal numbers expressed in scientific notation

A.8. you use a scientific calculator to compute expressions that involve addition, subtraction, multiplication, division, exponentiation, root taking or combinations of these with decimal numbers according to the standard order of operations

B. Use decimal numbers in solving word problems

Competence will be demonstrated:

B.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

B.1. you translate a verbally stated problem into performing an equivalent computation

B.2. you interpret the computed answer to a word problem

B.3. you check the reasonableness of a computed answer to a word problem

Unit 4. Percent Problems

A. Perform basic mathematical operations with numbers expressed as percents

Competence will be demonstrated:

A.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

A.1. you convert fractions or decimals into percentages and vice versa

A.2. you solve percent problems for the missing variable (amount, base, or percentage)

A.3. you use a scientific calculator to compute the answer to percent problems

B. Use percents in solving word problems

Competence will be demonstrated:

B.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

B.1. you translate a verbally stated application involving percentages into performing an equivalent computation

B.2. you solve percent problems that arise in personal finance

B.3. you interpret the computed answer to a word problem

B.4. you check the reasonableness of a computed answer to a word problem

Unit 5. Measurement

A. Perform calculations with quantities having units of measure

Competence will be demonstrated:

A.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

A.1. you perform addition, subtraction, multiplication, division, exponentiation, root taking or combinations of these operations for quantities expressed as measurements

A.2. you perform expresses the answer with the appropriate units

A.3. you use a scientific calculator to compute the answer to problems involving measured quantities

B. Convert measurements within the English system of units

Competence will be demonstrated:

B.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

B.1. you set up unit fractions to convert measurements from one unit to another

B.2. you use unit fractions to convert measurements from one unit to another

B.3. you convert area measurements to different square and cubic units of length measure

B.4. you convert volume measurements to different square and cubic units of length measure

C. Convert measurements within the metric system of units

Competence will be demonstrated:

C.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

C.1. you use the prefixes in the metric system to convert measurements within the metric system

C.2. you set up unit fractions to convert measurements from one unit to another

C.3. you use unit fractions to convert measurements from one unit to another

C.4. you convert metric area measurements to different metric square and cubic units of length measure

C.5. you convert volume measurements to different metric square and cubic units of length measure

D. Convert measurements between the metric and English systems

Competence will be demonstrated:

D.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

D.1. you set up unit fractions to convert measurements from specified English units to specified metric units

D.2. you use unit fractions to convert measurements from specified English units to specified metric units

D.3. you set up unit fractions to convert measurements from specified metric units to specified English units

D.4. you set uses unit fractions to convert measurements from specified metric units to specified English units

E. Read measurements from both metric and English micrometers

Competence will be demonstrated:

E.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

E.1. you read an English Vernier micrometer to the nearest .00001 inches

E.2. you read a common metric micrometer to the nearest .001 mm

Unit 6. Applied Plane Geometry

A. Use and compute angle measurements

Competence will be demonstrated:

A.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

A.1. you label angles in a diagram

A.2. you interpret diagrams with labeled angles

A.3. you convert decimal degrees into DMS notation and visa versa

A.4. you perform DMS to DD conversions on a scientific calculator

A.5. you perform DD to DMS conversions on a scientific calculator

A.6. you use properties of parallel and intersecting lines and polygons to solve for missing angles in a figure

B. Use properties of triangles and other polygons

Competence will be demonstrated:

B.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

B.1. you identify polygons (triangles, quadrilaterals and hexagons)

B.2. you identify special cases of triangles (isosceles, equilateral, right)

B.3. you identify quadrilaterals (rectangles, squares, parallelograms, trapezoids)

B.4. you solves for missing angles in a triangle and polygon

B.5. you solves for missing sides in a triangle and polygon

B.6. you recognizes the rules of congruence (SAS, ASA, SSS) for triangles

B.7. you uses the rules of congruence (SAS, ASA, SSS) for triangles

C. Perform calculations using the Pythagorean Theorem

Competence will be demonstrated:

C.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

C.1. you use the Pythagorean Theorem to solve for any missing side of a right triangle

C.2. you determine the height of an isosceles triangle with given sides by dropping a perpendicular and using the Pythagorean Theorem

C.3. you use a scientific calculator to perform calculations involving the Pythagorean Theorem

D. Calculate perimeters and areas of closed planar figures

Competence will be demonstrated:

D.1. in the solution to a problem on a quiz, homework, project or exam

Criteria - Performance will be satisfactory when:

D.1. you compute (given sufficient data) the perimeters and areas of rectangles

D.2. you compute (given sufficient data) the perimeters and areas of triangles

D.3. you compute (given sufficient data) the perimeters and areas of parallelograms

D.4. you computes (given sufficient data) the perimeters and areas of trapezoids

D.5. you computes (given sufficient data) the perimeters and areas of regular hexagons

D.6. you correctly uses a scientific calculator to compute the area of a triangle (given the lengths of its sides) from Heron's formula

D.7. you computes the area of a circle given its radius or diameter

D.8. you computes the circumference of a circle given its radius or diameter