



Western Technical College

31804317 Applied Math - Welding

Course Outcome Summary

Course Information

Description	Development of basic math skills needed to solve general problems encountered in industry. These include working with fractions and decimals, calculator operation, measurement and conversion, perimeter, area, volume, proportion and ratio, percents, and formulas.
Instructional Level	Technical Diploma Courses
Total Credits	1
Total Hours	36

Textbooks

No textbook required.

Learner Supplies

Scientific calculator - \$10-20. **Vendor:** Campus Shop. Required.

Success Abilities

1. Cultivate Passion: Expand a Growth-Mindset
2. Live Responsibly: Develop Resilience
3. Live Responsibly: Foster Accountability
4. Refine Professionalism: Improve Critical Thinking

Program Outcomes

1. Interpret welding drawings

2. Perform thermal cutting

Course Competencies

1. Calculate with real numbers.

Assessment Strategies

- 1.1. Skill Demonstration
- 1.2. Written Objective Test - score 70% or better

Criteria

You will know you are successful when

- 1.1. you perform the steps for each algorithm in the right order.
- 1.2. you determine which fractional operations require common denominators.
- 1.3. you determine which fractional operations require mixed numbers to be written as fractions greater than one.
- 1.4. you determine how to handle the decimal point for all decimal operations.

Learning Objectives

- 1.a. Convert between improper fractions and mixed numbers.
- 1.b. Reduce fractions to lowest terms.
- 1.c. Apply operations of addition, subtraction, multiplication, and division to fractions.
- 1.d. Convert numbers between fraction and decimal form.
- 1.e. Convert decimals between written (word) and numeric form.
- 1.f. Round decimal values to a specified precision.
- 1.g. Apply operations of addition, subtraction, multiplication and division to decimal numbers
- 1.h. Evaluate arithmetic expressions using proper rules of order
- 1.i. Solve applied problems related to the transportation trades involving fractions and decimals

2. Apply ratio and proportion concepts to solve problems.

Assessment Strategies

- 2.1. Skill Demonstration
- 2.2. Written Objective Test - score 70% or better

Criteria

You will know you are successful when

- 2.1. you use decimal approximation and correct units to write a ratio as a unit rate.
- 2.2. you perform any numeric or unit cancelling necessary to write a ratio in lowest terms.
- 2.3. you solve proportions containing decimals using cross-multiplication and conventional rounding techniques.
- 2.4. you solve proportions containing fractions by using proper fractional multiplication and division techniques.
- 2.5. you use proportions to solve problems involving scale, including the determination of actual size given a blueprint.

Learning Objectives

- 2.a. Write the ratio between given quantities as a unit rate and in lowest terms
- 2.b. Solve for the unknown quantity in a given proportion containing decimals
- 2.c. Solve for the unknown quantity in a given proportion containing fractions
- 2.d. Use proportions to determine size given a blueprint and scale

3. Apply percent concepts to solve problems.

Assessment Strategies

- 3.1. Skill Demonstration
- 3.2. Written Objective Test - score 70% or better

Criteria

You will know you are successful when

- 3.1. you convert between decimal numbers and percents.

- 3.2. you convert between fractions and percents by dividing or treating percents as fractions.
- 3.3. you identify base, rate, and amount in a percent problem and use the $a=br$ relationship or percent proportions to solve for an unknown in such problems.
- 3.4. you calculate the value of a percent discount, percent markup, sales tax, or any combination of these and round the answer.
- 3.5. you calculate the actual tolerance from a percent tolerance and determine if a given measurement is within the allowable range for a percent tolerance.

Learning Objectives

- 3.a. Convert between decimal, fraction, and percent form of a number.
- 3.b. Identify the base, rate, and amount within a percent application.
- 3.c. Use proportions or decimal equivalents to solve problems involving percent markup, percent discount, and sales tax.
- 3.d. Calculate the minimum and maximum values of an acceptable range given a nominal value and percent tolerance.
- 3.e. Solve applied percent problems related to the welding and fabrication trades.

4. Change units on measurements.

Assessment Strategies

- 4.1. Skill Demonstration
- 4.2. Written Objective Test - score 70% or better

Criteria

You will know you are successful when

- 4.1. you set up conversions using the unit-fraction method.
- 4.2. you cancel unwanted units to yield desired units when using the unit-fraction conversion method.
- 4.3. you set up rate conversions using the unit-fraction method to convert fuel economy values, velocities, and flow rates.
- 4.4. you convert temperature measurements between the Centigrade and Fahrenheit scales by identifying and using the correct formula or application.

Learning Objectives

- 4.a. Use the unit-fraction conversion method to convert measurements within the U.S. customary system and between the U.S. customary and metric systems.
- 4.b. Apply the unit-conversion fraction method to conversions involving rates.
- 4.c. Convert temperature measurements between the Celcius, Fahrenheit, Rankin, and Kelvin scales.

5. Solve problems involving geometric concepts.

Assessment Strategies

- 5.1. Skill Demonstration
- 5.2. Written Objective Test - score 70% or better

Criteria

You will know you are successful when:

- 5.1. you apply the Pythagorean theorem to determine hypotenuse length given both legs, leg length given, the length of the other leg, and the hypotenuse.
- 5.2. you calculate perimeters of simple and compound shapes involving straight edges, circles, or parts of circles after completing any conversions to make dissimilar units match.
- 5.3. you calculate areas of triangles, rectangles, parallelograms, circles, and composite shapes containing simpler shapes using the Pythagorean Theorem to find critical dimensions when necessary.
- 5.4. you calculate the volume of prisms, cylinders, spheres, and composite solids composed of simpler parts.

Learning Objectives

- 5.a. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles.
- 5.b. Calculate the perimeter of simple and compound geometric figures with consistent or inconsistent unit measures.
- 5.c. Calculate the area of geometric figures including quadrilaterals, triangles, circles, and composite figures.
- 5.d. Calculate the volume of various geometric solids including spheres, rectangular solids, cylinders,

prisms, and composite solids.