Western Technical College

31804335 Manufacturing Math 2

Course Outcome Summary

Course Information

Description	Essential intermediate math skills for manufacturing careers. Topics covered include basic algebra for solving equations and formulas, ratios, proportions, order of operations, and types of variation. Course applies concepts in the context of measurement, inspection, gear production and machining.
Instructional Level	Technical Diploma Courses
Total Credits	1
Total Hours	36

Textbooks

Mathematics for Machine Technology – with MindTap. 8th Edition. Copyright 2020. Smith, Robert D. Publisher: Cengage Learning. **ISBN-13**: 978-1-337-79837-2. Required.

Learner Supplies

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

Six-inch steel rule - $3.00. **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

Course Competencies

1.   Solve problems involving geometric shapes.

Criteria

Criteria - Performance will be satisfactory when:

1.1. learner calculates perimeter, area, and volume of geometric figures.
1.2. learner selects and uses the appropriate geometric formula/s to solve application problems.
1.3. learner uses gauge block tables to compute heights needed to set heights for machining purposes.

Learning Objectives
1.a. Develop an understanding of, and when to use, geometric formulas for perimeter, area, and volume calculations.
1.b. Calculate the perimeter, area, and volume of various geometric shapes.
1.c. Solve application problems involving geometric shapes.
1.d. Determine the minimum number of gauge blocks needed to give a desired dimension.

2. Perform operations on algebraic expressions.

Criteria

Criteria - Performance will be satisfactory when:
2.1. learner performs operations using signed numbers.
2.2. learner simplifies algebraic expressions by use of the distributive property and combining like terms.
2.3. learner evaluates algebraic expressions.

Learning Objectives
2.a. Define algebraic terminology; variable, term, like terms, powers, and roots.
2.b. Evaluate algebraic expressions using signed numbers.
2.c. Combine like terms containing a variable.
2.d. Simplify expressions by removing parenthesis and combining like terms.

3. Solve algebraic equations and formulas.

Criteria

Criteria - Performance will be satisfactory when:
3.1. learner solves linear equations.
3.2. learner translates English phrases into equations.
3.3. learner rearranges and evaluates formulas.
3.4. learner solves special equations containing parentheses and fractions.

Learning Objectives
3.a. Solve equations using the addition, subtraction, multiplication, and division properties of equations where the variable is on one side of the equation.
3.b. Solve equations where the variable is on both sides of the equal sign.
3.c. Transcribe written phrases into algebraic equations and solve.
3.d. Rearrange equations by isolating the variable.
3.e. Solve literal equations.
3.f. Solve equations containing parenthesis.
3.g. Solve fractional equations.
3.h. Apply equation solving skills to machine tool formulas.

4. Solve equations with powers and roots.

Criteria

Criteria - Performance will be satisfactory when:
4.1. learner solves equations containing powers.
4.2. learner solves equations containing roots.

Learning Objectives
4.a. Solve equations where the variable is raised to the second power.
4.b. Apply equation solving techniques for powers to solve equations of the third degree or higher.
4.c. Solve equations containing square roots.
4.d. Apply equation solving techniques for roots to solve equations where the root is three or higher.
4.e. Solve machine tool formulas containing powers, roots, or both.

5. Apply equations solving techniques to special machine tool formulas.

Criteria

Criteria - Performance will be satisfactory when:

5.1. learner evaluates machine tool formulas for cutting speed and cutting time.
5.2. learner evaluates machine tool formulas dealing with spur gears.

Learning Objectives

5.a. Compute the solution to the machine tool formula for cutting speed.
5.b. Use equation solving techniques on the cutting speed formula to determine the machine's speed (rpms).
5.c. Compute the solution to the machine tool formula for cutting time.
5.d. Use equation solving techniques on the cutting time formula to determine the length of cut needed.
5.e. Solve spur gear formulas.
5.f. Apply equation solving techniques to solve spur gear applications involving more than one formula.