**Lakeshore Technical College**

# 31-420-326 Machine Tool Math - Intermediate

## Course Outcome Summary

### Course Information

**Description** ...prepares the learner with the necessary skills to use scientific calculators for the application of algebra, geometry, and trigonometry. This advanced course when delivered in the evening is self-paced, open-entry/exit, and designed for individualized student needs.

**Total Credits** 1

**Total Hours** 36

### Pre/Corequisites

Corequisite 31-420-325 Machine Tool Basic Math

### Course Competencies

**1. Solve equations by addition, subtraction, multiplication, division, and root and power principles.**

**Linked Core Abilities**

Apply learning
Demonstrate critical thinking
Demonstrate responsible and professional workplace behaviors
Use mathematics effectively

**Linked Program Outcomes**

Interpret industrial/engineering drawings

**Assessment Strategies**

1.1. Skillbuilder Exercise
1.2. Written Test

**Criteria**

*Your performance will be successful when:*

1.1. learner submits the assignment.
1.2. you can solve equations using addition, subtraction, multiplication, division, root and power principles .
1.3. learner completes the unit test.

**Learning Objectives**

1.a. Solve equations using the principle of equality.
1.b. Solve equations using the root principle of equality.
1.c. Solve equations using the power principle of equality.
1.d. Write comparisons as ratios.

**2. Solve equations by rearrangement of formulas.**

**Linked Core Abilities**
Apply learning
Demonstrate critical thinking
Demonstrate responsible and professional workplace behaviors
Use mathematics effectively

**Linked Program Outcomes**
Interpret industrial/engineering drawings

**Assessment Strategies**
2.1. Skillbuilder Exercise
2.2. Written Test

**Criteria**

*Your performance will be successful when:*

2.1. learner submits the assignment.
2.2. you can solve equations by rearrangement.
2.3. learner completes the unit test.

**Learning Objectives**
2.a. Solve equations involving several operations.
2.b. Rearrange formulas in terms of any letter value.
2.c. Substitute values in formulas and solve.
2.d. Write comparisons as ratios.
2.e. Express ratios in lowest terms.
2.f. Solve for the unknown term of a proportion.
2.g. Set up and solve direct and inverse proportions.

## 3. Solve problems involving lines and angular measure.

**Linked Core Abilities**
Apply learning
Demonstrate critical thinking
Demonstrate responsible and professional workplace behaviors
Use mathematics effectively

**Linked Program Outcomes**
Interpret industrial/engineering drawings
Apply precision measuring methods to part inspection

**Assessment Strategies**
3.1. Skillbuilder Exercise
3.2. Written Test

**Criteria**

*Your performance will be successful when:*

3.1. learner submits the assignment.
3.2. you can solve problems of lines and angular measurement.
3.3. learner completes the unit test.

**Learning Objectives**
3.a. Add, subtract, multiply, and divide angles in terms of degrees, minutes, and seconds.
3.b. Express decimal degrees as degrees, minutes, and seconds.
3.c. Express degrees, minutes, and seconds as decimal degrees.
3.d. Solve problems that involve combinations of roots with other basic arithmetic operations.
3.e. Solve problems consisting of combinations of operations by applying the order of operations.
3.f. Perform individual operations of addition, subtraction, multiplication, division, powers, and roots with decimals using a calculator.
3.g. Measure angles with a simple protractor.
3.h. Layout angles with a simple protractor.
3.i. Compute compliments and supplements of angles.

## 4. Solve unknown angles using angular principles.

**Linked Core Abilities**
Apply learning
Demonstrate critical thinking
Demonstrate responsible and professional workplace behaviors
Use mathematics effectively

**Linked Program Outcomes**
Interpret industrial/engineering drawings
Apply precision measuring methods to part inspection

**Assessment Strategies**
4.1. Skillbuilder Exercise
4.2. Written Test

**Criteria**

*Your performance will be successful when:*

4.1. learner submits the assignment.
4.2. you can solve for unknown angles using geometric principles .
4.3. learner completes the unit test.

**Learning Objectives**
4.a. Identify different types of angles.
4.b. Determine unknown angles in geometric figures using the principles of opposite, alternate interior, corresponding, parallel, and perpendicular angles.

## 5. Solve angles and sides of triangles.

**Linked Core Abilities**
Apply learning
Demonstrate critical thinking
Demonstrate responsible and professional workplace behaviors
Use mathematics effectively

**Linked Program Outcomes**
Interpret industrial/engineering drawings
Apply precision measuring methods to part inspection

**Assessment Strategies**
5.1. Skillbuilder Exercise
5.2. Written Test

**Criteria**

*Your performance will be successful when:*

5.1. learner submits the assignment.
5.2. you can solve angles and sides of triangles.
5.3. learner completes the unit test.

**Learning Objectives**
5.a. Identify different types of triangles.
5.b. Determine the unknown angles based on the principles that all triangles contain 180 degrees.
5.c. Identify corresponding parts of triangles.
5.d. Compute angles and sides of isosceles, equilateral, and right triangles.
5.e. Determine interior angles of any polygon.

## 6. Solve for the functions of angles given in decimal degrees and degrees, minutes, and seconds.

**Linked Core Abilities**
Apply learning
Demonstrate critical thinking
Demonstrate responsible and professional workplace behaviors
Use mathematics effectively

**Linked Program Outcomes**
Interpret industrial/engineering drawings
Apply precision measuring methods to part inspection

**Assessment Strategies**
6.1. Skillbuilder Exercise
6.2. Written Test

**Criteria**

*Your performance will be successful when:*

6.1. learner submits the assignment.
6.2. you can solve the functions of angles.
6.3. learner completes the unit test.

**Learning Objectives**
6.a. Identify the sides of a right angle triangle with reference to any angle.
6.b. State the ratios of the six trigonometric functions in relation to given triangles.
6.c. Find functions of angles given in decimal degrees and degrees, minutes, and seconds.
6.d. Find angles in decimal degrees and degrees, minutes, and seconds.

## 7. Solve for the angles and length of sides in a right triangle.

**Linked Core Abilities**
Apply learning
Demonstrate critical thinking
Demonstrate responsible and professional workplace behaviors
Use mathematics effectively

**Linked Program Outcomes**
Interpret industrial/engineering drawings
Apply precision measuring methods to part inspection

**Assessment Strategies**
7.1. Skillbuilder Exercise
7.2. Written Test

**Criteria**

*Your performance will be successful when:*

7.1. learner submits the assignment.
7.2. you can solve for angles and sides of a right triangle.
7.3. learner completes the unit test.

**Learning Objectives**
7.a. Compute an unknown angle of a right triangle when two sides are known.
7.b. Compute an unknown side of a right triangle when an angle and a side are known.

## 8. Solve simple practical machine application problems.

**Linked Core Abilities**
Apply learning
Demonstrate critical thinking
Demonstrate responsible and professional workplace behaviors
Use mathematics effectively

**Linked Program Outcomes**
Interpret industrial/engineering drawings

**Assessment Strategies**
8.1. Skillbuilder Exercise
8.2. Written Test

**Criteria**

*Your performance will be successful when:*

8.1. learner submits the assignment.
8.2. you can solve practical right triangle problems with applied trigonometry.
8.3. learner completes the unit test.

**Learning Objectives**

8.a. Solve simple machine technology problems that require the projection of auxiliary lines and the use of geometric principles and trigonometric functions.

## 9. Interpret the Cartesian Coordinate System as it applies to vise set-ups