

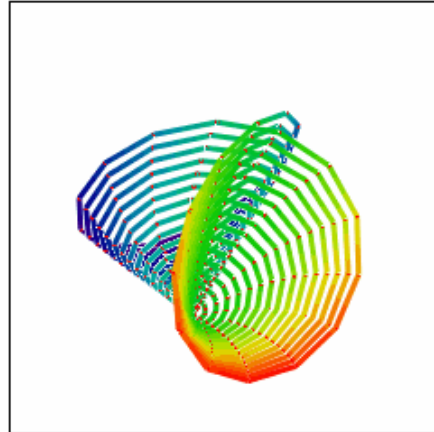
Mathcad 15.0 Essentials

Overview

Course Code **TRN-3300-T**

Course Length **2 Days**

This course introduces the essentials of Mathcad, including its unique whiteboard interface, and math toolbars. It reinforces Mathcad's extensive functionality using clear, straightforward, trainer-led instruction and examples. This course will familiarize the user with many of Mathcad's critical features to ensure immediate application of the product.



Course Objectives

- Open and save Mathcad files.
- Navigate the Mathcad workspace.
- Identify and format math and text regions.
- Develop and edit math expressions.
- Define, evaluate, and use variables.
- Assign an expression retroactively.
- Define and evaluate user-defined and built-in functions.
- Define, evaluate, and use range variables.
- Use units in calculations.
- Plot 2-D and 3-D graphs.
- Solve for the roots of a function with a single independent variable.
- Numerically and symbolically solve a system of linear and nonlinear equations.
- Solve unconstrained and constrained optimization problems.
- Solve ordinary and partial differential equations.
- Create a program within the Mathcad worksheet using Mathcad's programming features.
- Import and export data.
- Smooth, interpolate, and regress data.

$$\frac{\left(\frac{1}{16}\right) i \cdot \sqrt{2}}{x - i \cdot \sqrt{2}} - \frac{\frac{1}{16} \cdot i \cdot \sqrt{2}}{x + i \cdot \sqrt{2}} \text{ simplify } \rightarrow -\frac{1}{4 \cdot x^2 + 8}$$

Prerequisites

- N/A

Audience

- This class is intended for the novice or intermediate user of Mathcad.
-

Agenda

Day 1

Module 1	Getting Started
Module 2	The Mathcad Workspace
Module 3	Documenting and Formatting
Module 4	Entering and Editing Math
Module 5	Variables
Module 6	Functions
Module 7	Range Variables
Module 8	Controlling Calculations
Module 9	Vectors and Matrices
Module 10	Units
Module 11	2-D Plotting

Day 2

Module 12	3-D Plotting
Module 13	Boolean Conditions
Module 14	Symbolics
Module 15	Solving
Module 16	Optimization
Module 17	Differential Equations
Module 18	Programming
Module 19	Data Exchange
Module 20	Data Analysis

Course Content

Module 1. Getting Started

- i. Opening Mathcad
- ii. Saving Mathcad Files

Module 2. The Mathcad Workspace

- i. Opening Mathcad Toolbars
- ii. Opening Math Toolbars
- iii. Accessing Mathcad Help
- iv. Accessing the Author's Reference
- v. Accessing the Developer's Reference

Module 3. Documenting and Formatting

- i. Text Regions
- ii. Embedding Math in a Text Region
- iii. Options for Formatting Worksheets
- iv. Mathcad Templates

Module 4. Entering and Editing Math

- i. The Calculator Toolbar
- ii. Using Editing Lines
- iii. Additional Editing Techniques
- iv. Modifying Operators
- v. Formatting Math Regions
- vi. Implied Multiplication

Module 5. Variables

- i. Defining a Variable
- ii. Numerically Evaluating a Variable
- iii. Defining a Global Variable
- iv. Assigning an Expression Retroactively
- v. Using Literal Subscripts

Module 6. Functions

- i. Defining A User-Defined Function
- ii. Inserting a Built-In Function

Module 7. Range Variables

- i. Defining a Range Variable
- ii. Using a Range Variable

Module 8. Controlling Calculations

- i. Controlling Calculations
 - ii. Locking Calculations
-

Module 9. Vectors and Matrices

- i. Vectors and Matrices
- ii. Defining Vectors and Matrices
- iii. Extracting Elements From an Array
- iv. Nested Arrays
- v. Using Array Operators and Functions

Module 10. Units

- i. Selecting and Customizing a Unit System
- ii. Using Units
- iii. Adding Units to Arrays and Range Variables
- iv. Using Angular Units
- v. Using Temperature Units

Module 11. 2-D Plotting

- i. Plotting Data in 2-D
- ii. Plotting Functions in 2-D
- iii. 2-D Plot Formatting
- iv. 2-D Trace Formatting
- v. 2-D Axes Formatting
- vi. 2-D Plot Labels
- vii. 2-D Plotting Features
- viii. Using Units With 2-D Plots

Module 12. 3-D Plotting

- i. Plotting Functions in 3-D
- ii. Formatting a Contour Plot
- iii. Plotting Data in 3-D
- iv. Plotting Multiple Traces
- v. 3-D Plot Formatting

Module 13. Boolean Conditions

- i. Using Boolean Operators
- ii. Using Piecewise Continuous Functions

Module 14. Symbolics

- i. Symbolics
- ii. Live Symbolic Calculation
- iii. Symbolic Algebra
- iv. Formatting the Symbolics Display
- v. Menu Driven Symbolics

Module 15. Solving

- i. Solving for Roots of Equations
 - ii. Numerically Solving Systems of Linear Equations
-

- iii. Numerically Solving Systems of Nonlinear Equations
- iv. Symbolically Solving Systems of Equations
- v. Modifying the Solving Algorithm and Convergence Tolerance

Module 16. Optimization

- i. Constrained Optimization
- ii. Unconstrained Optimization

Module 17. Differential Equations

- i. Ordinary Differential Equations
- ii. Partial Differential Equations

Module 18. Programming

- i. Creating a Program
- ii. Conditional Statements
- iii. Looping Constructs

Module 19. Data Exchange

- i. Importing Data
- ii. Exporting Data

Module 20. Data Analysis

- i. Data Analysis
 - ii. Smoothing Data
 - iii. Interpolating Data
 - iv. Regressing Data
-