

Mathcad Prime Curriculum Guide

Live Classroom Curriculum Guide

- Mathcad Prime 1.0 Essentials
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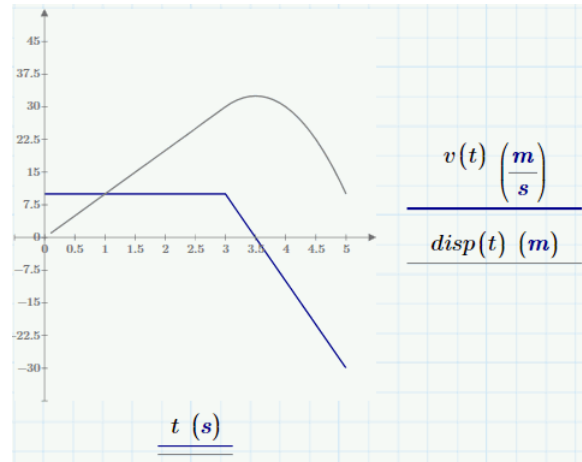
Mathcad Prime 1.0 Essentials

Overview

Course Code **TRN-3260-T**

Course Length **2 Days**

This course introduces the essentials of Mathcad Prime. It reinforces Mathcad Prime's extensive functionality using clear, straightforward, trainer-led instruction and examples. This course will familiarize the user with many of Mathcad Prime'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 graphs.
- Solve for the roots of a function with a single independent variable.
- Numerically solve a system of linear and nonlinear equations.
- Solve unconstrained and constrained optimization problems.
- Solve ordinary differential equations.
- Create a program within the Mathcad worksheet using Mathcad's programming features.
- Import and export data.
- Smooth, interpolate, and regress data.

$$v(t) := 10 \cdot \frac{m}{s} + \left(-20 \cdot \frac{m}{s^2}\right) \cdot (t - 3 \cdot s) \cdot (t > 3 \cdot s)$$

Prerequisites

- N/A

Audience

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

Day 1

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

Day 2

Module 11	Boolean Conditions
Module 12	Solving
Module 13	Optimization
Module 14	Differential Equations
Module 15	Programming
Module 16	Data Exchange
Module 17	Data Analysis
Module 18	Challenge Exercise Solutions

Web Based Curriculum Guide

- Mathcad Prime 1.0 - Application Orientation
 - Mathcad Prime 1.0 - Plotting
 - Mathcad Prime 1.0 - Working With Units
 - Mathcad Prime 1.0 - Solving Equations
 - Mathcad Prime 1.0 - Programming Mathematical Expressions
 - Mathcad Prime 1.0 - Data Exchange and Analysis
 - Mathcad Prime 1.0 Integration with Creo Elements/Pro 5.0
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Mathcad Prime 1.0 - Application Orientation

Overview

Course Code SAB-CEK5189

Course Length 4 Hours

This course introduces the essentials of Mathcad Prime. It reinforces Mathcad Prime's extensive functionality using clear, straightforward instruction and examples. This course will familiarize the user with many of Mathcad Prime's critical features to ensure immediate application of the product.

$$Var := \int_0^{\pi} \cos\left(\frac{2 \cdot \pi \cdot t}{5}\right) \cdot \sin\left(\frac{2 \cdot \pi \cdot t}{7}\right) dt$$

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.
- Define and use vectors and matrices.

$$CP := \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

Prerequisites

- N/A

Audience

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

Table of Contents

Module	1	Getting Started
Module	2	Documenting and Formatting
Module	3	Entering and Editing Math
Module	4	Variables
Module	5	Functions
Module	6	Range Variables
Module	7	Controlling Calculations
Module	8	Vectors and Matrices

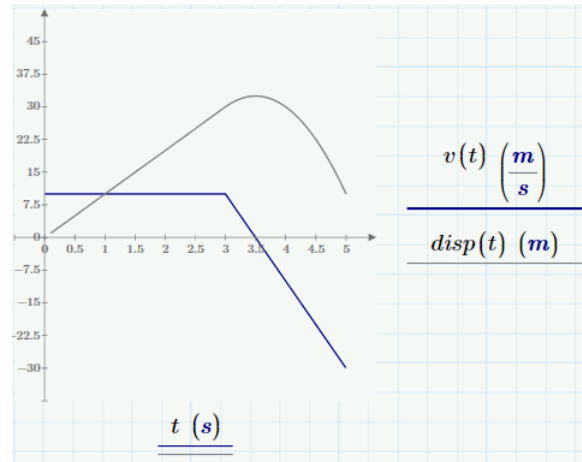
Mathcad Prime 1.0 - Plotting

Overview

Course Code SAB-CEK5190

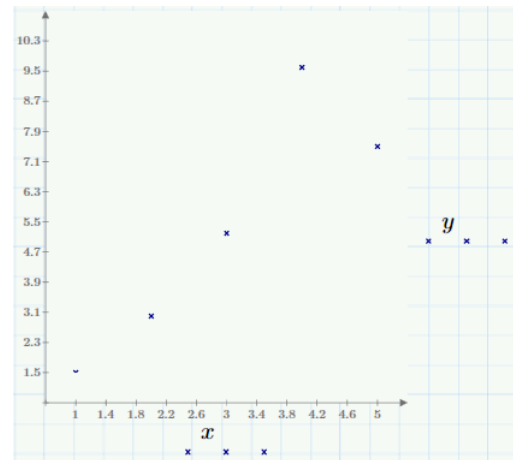
Course Length 2 Hours

This course introduces the essentials of 2-D Plotting using Mathcad Prime. It reinforces Mathcad Prime's plotting functionality using clear, straightforward instruction and examples.



Course Objectives

- Plot 2-D graphs.
- Format 2-D graphs.



Prerequisites

- CEK-5189 Mathcad Prime 1.0 – Application Orientation

Audience

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

Table of Contents

Module 1 2-D Plotting

Mathcad Prime 1.0 - Working With Units

Overview

Course Code SAB-CEK5191

Course Length 2 Hours

$mass := 40 \cdot kg$

This course introduces the essentials of working with units using Mathcad Prime. It reinforces Mathcad Prime's units functionality using clear, straightforward instruction and examples.

Course Objectives

- Use units in calculations.

$10 \text{ } ^\circ F - 10 \text{ } \Delta^\circ F = 0 \text{ } ^\circ F$

Prerequisites

- CEK-5189 Mathcad Prime 1.0 – Application Orientation

Audience

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

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Module 1 Units

Mathcad Prime 1.0 - Solving Equations

Overview

Course Code SAB-CEK5192

Course Length 2 Hours

This course introduces the essentials of solving equations using Mathcad Prime. It reinforces Mathcad Prime's units functionality using clear, straightforward instruction and examples.

$$f(t) := 15 \cdot (\cos(t) - \sin(t))$$

$$t := 1$$

$$\text{root}(f(t), t) = 0.785$$

Course Objectives

- Solve for the roots of a function with a single independent variable.
- Numerically solve a system of linear and nonlinear equations.
- Solve unconstrained and constrained optimization problems.
- Solve ordinary differential equations.

The screenshot shows a Mathcad Prime worksheet with three sections: 'Guess Values', 'Constraints', and 'Solver'. In the 'Guess Values' section, there are two equations: $a := 1$ and $b := 1$. In the 'Constraints' section, there is a matrix equation: $M \cdot \begin{bmatrix} a \\ b \end{bmatrix} = v$. In the 'Solver' section, there is a command: $\begin{bmatrix} a \\ b \end{bmatrix} := \text{find}(a, b)$.

Prerequisites

- CEK-5189 Mathcad Prime 1.0 – Application Orientation

Audience

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

Table of Contents

Module	1	Boolean Conditions
Module	2	Solving
Module	3	Optimization
Module	4	Differential Equations

Mathcad Prime 1.0 - Programming Mathematical Expressions

Overview

Course Code SAB-CEK5193

Course Length 3 Hours

This course introduces the essentials of programming using Mathcad Prime. It reinforces Mathcad Prime's units functionality using clear, straightforward instruction and examples.

```

Newton(x, tol) :=
  r ← x / 2
  rnew ← (r + x / (2 * r)) / 2
  while |rnew - r| > tol
    r ← rnew
    rnew ← (r + x / (2 * r)) / 2
  
```

Course Objectives

- Create a program within the Mathcad worksheet using Mathcad's programming features.

```

IsOdd(x) :=
  if |mod(x, 2) = 1|
    word ← "True"
  else
    word ← "False"
  
```

Prerequisites

- CEK-5189 Mathcad Prime 1.0 – Application Orientation

Audience

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

Table of Contents

Module 1 Programming

Mathcad Prime 1.0 - Data Exchange and Analysis

Overview

Course Code SAB-CEK5194

Course Length 3 Hours

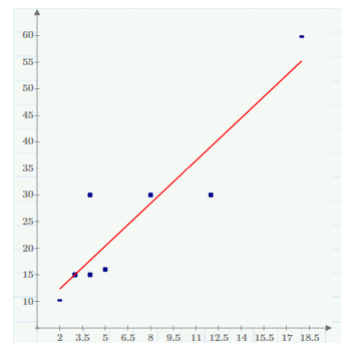
```
EX:=READEXCEL("..\student\MC Prime Data Files\datastep_07.xlsx", "datastep!A1:B4")
```

$$EX = \begin{bmatrix} -10 & 7.04 \\ -9 & 19.78 \\ -8 & 43.39 \\ -7 & 45.55 \end{bmatrix}$$

This course introduces the essentials of importing and exporting data, and data analysis using Mathcad Prime. It reinforces Mathcad Prime's units functionality using clear, straightforward instruction and examples.

Course Objectives

- Import and export data.
- Smooth, interpolate, and regress data.



Prerequisites

- CEK-5189 Mathcad Prime 1.0 – Application Orientation
- CEK-5190 Mathcad Prime 1.0 – Plotting

Audience

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

Table of Contents

Module 1 Data Exchange

Module 2 Data Analysis

Mathcad Prime 1.0 Integration with Creo Elements/Pro 5.0

Overview

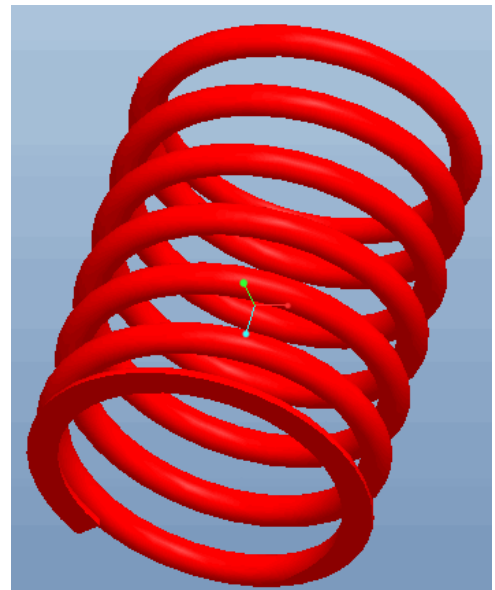
Course Code	SAB-CEK5164
Course Length	2 hours

This course is designed for users who already know Mathcad Prime and Creo Elements/Pro 5.0 and wish to understand how to use both of the products in conjunction with one another.

Number of Active Coils:	$N_c := 1$
Diameter of the wire:	$d_w := 1 \cdot \text{mm} = 0.039 \text{ in}$
Force on the spring:	$F := 1 \cdot N = 0.225 \text{ lbf}$
Coil diameter:	$D_c := 10 \cdot \text{mm}$
Shear modulus:	$G := 77.2 \cdot \text{GPa} = (1.12 \cdot 10^7) \text{ psi}$

Course Objectives

- Understanding licensing and software requirements.
- Mapping variables in Mathcad Prime to receive information from Creo Elements/Pro 5.0.
- Mapping variables in Mathcad Prime to return information to Creo Elements/Pro 5.0.
- Performing a Mathcad analysis in Creo Elements/Pro 5.0.



Prerequisites

- T3260 Mathcad Prime 1.0 Essentials or equivalent experience.
- T2232 Introduction to Creo Elements/Pro 5.0 or equivalent experience.

Audience

This course is intended for design engineers and mechanical designers. People in related roles will also benefit from taking this course.

Agenda

Day 1

Module 1

Mathcad Prime 1.0 Integration with Creo Elements/Pro 5.0