

# MA153 Lesson 7

## LESSON 7 - Vector Functions and Space Curves

4 September, 2008

# Outline

- 1 Admin
- 2 Last Class
  - Do Problem Help
- 3 Vector Functions and Space Curves
  - Course Guide
  - Vector Functions
- 4 Look Forward

# Admin

- 1 Homework 2 is due 10 September in class - The assignment is posted on the web site

# Admin

- 2 Mid Term Exam 1 is on 11 September during normal class time

# Admin

- 3 FCE grades will be posted on CIS today. We will return the exam on Friday

# Admin

- 4 You will get a chance to do a problem similar to problem 4 over the weekend for bonus points

# FCE, Cylinders and Quadric Surfaces

Questions?

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## Do Problem Help

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# Objectives

## Vector Functions and Space Curves (Stewart 13.1)

- 1 Determine the limit of a vector function.
- 2 Understand the connection between space curves and the ranges of vector functions.
- 3 Be able to match vector functions with their space curves.
- 4 Understand that parameterizations of space curves are not unique.
- 5 Describe the curve of intersection of two surfaces.

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# Explanations

**1** Going back to parametric equations:

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# Explanations

## 1 Going back to parametric equations:

- 1 A parametric equation was described as  $[x = f(t), y = g(t)]$
- 2 A parametric equation describes how  $x$  and  $y$  changed with respect to the independent variable.

# Explanations

## 2 Vector Functions:

# Explanations

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- 1 A Vector Function just describes the components of a vector as functions of the independent variable.

# Explanations

## 2 Vector Functions:

- 1 A Vector Function just describes the components of a vector as functions of the independent variable.
- 2 We usually describe a vector function in the following way
$$\mathbf{r}(t) = \langle f(t), g(t), h(t) \rangle = f(t)\mathbf{i} + g(t)\mathbf{j} + h(t)\mathbf{k}$$

# Board Work

- 1 Page 822 - Problem 2
- 2 Page 822 - Problem 9
- 3 Page 822 - Problem 15
- 4 Page 822 - Problem 20
- 5 Page 823 - Problem 23

# Examples and Homework Help

- 1 Mathematica Examples
- 2 Section 13.1/ 3, 10, 19, 30

# Look Forward

## Derivatives and Integrals of Vector Functions (Stewart 13.2)

- 1 Determine the derivative of a vector function
- 2 Understand and determine the unit tangent vector.
- 3 Determine the tangent line to a space curve at any point.
- 4 Understand the geometric interpretation of the tangent vector and smooth curves
- 5 Determine the integral of a vector function.

# Questions?

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