MA153 Lesson 36

LESSON 36 - Vector Fields

28 RockTober, 2008

Outline

Admin

1. This week - Vector Fields, Line Integrals I and II on Wednesday and Thursday

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2. Next Week - Line Integrals III Monday, Greens Theorem Tuesday and Wednesday, Drop Thursday, Guest Lecture Friday

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3. Congratulations SSG Inch - Earned the Silver Star!

Outline

WPR III

Block IV - Chapter 16

1. Vector Fields - 16.1: Functions that assign vectors to points in space.

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3. Fundamental Theorem for Line Integrals - 16.3: Using FTC for line integrals.
4. Green's Theorem - 16.4:
5. Curl and Divergence - 16.5:

Outline

Course Guide

Vector Fields - 16.1

1. Be able to sketch and interpret two- and three-dimensional vector fields
2. Develop an understanding of gradient vector fields, conservative vector fields, and potential functions.
3. Understand the relationship between the gradient field and level curves of a function of two variables.
4. Understand the relationship between the gradient field and level surfaces of a function of three variables.
5. Use Mathematica to plot different types of vector fields.
6. HOMEWORK PROBLEMS: 2, 11, 16, 26, 35

Outline

Definitions

1. Definition 1 - Page 1028 -
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2. Definition 2 - Page 1028 -
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3. Gradient Fields - Page 1031 -
   $\nabla f(x,y,z) = f_x(x,y,z)\,\hat{i} + f_y(x,y,z)\,\hat{j} + f_z(x,y,z)\,\hat{k}$

Outline

Mathematica and Vector Fields

1. Use the following package

Outline

Board Work

1. Problem 5, Page 1032
2. Problem 6, Page 1032

Outline

Homework Help

Look Forward

Line Integrals I - 16.2

1. Understand the meaning of the line integral of a scalar function $f(x, y)$ along a curve C.
2. Understand the meaning of $\int P dx + Q dy$ along a curve C.
3. Understand the relationship between line integrals and arc length.
4. Determine the line integral with respect to arc length of a multi-variable function.
5. Determine the line integral with respect to the variables of a multi-variable function.
6. Determine the line integral of a vector field.
7. Understand how line integrals relate to work.
8. HOMEWORK PROBLEMS: 1, 3, 10, 17

Questions?

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