

MA205 Lesson 23

Lesson 23 - Iterated Integrals Over Rectangular Regions I

Thursday, September 27, 2007

Outline

- 1 Questions From Lesson 22, Estimating
 - Estimating
- 2 Iterated Integrals
 - Iterated Integrals Step by Step
 - An Example
 - Fubini's Theorem
 - Some Board Problems
- 3 Lesson Link

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Estimating

- Look at the Quiz

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Iterated Integrals Step by Step

- 1 Create a 3D plot of the surface over the region

Iterated Integrals Step by Step

- 1 Create a 3D plot of the surface over the region
- 2 Draw and label the region

Iterated Integrals Step by Step

- 1 Create a 3D plot of the surface over the region
- 2 Draw and label the region
- 3 Choose the order of integration

Iterated Integrals Step by Step

- 1 Create a 3D plot of the surface over the region
- 2 Draw and label the region
- 3 Choose the order of integration
- 4 Compute/Evaluate the "inside" integral

Iterated Integrals Step by Step

- 1 Create a 3D plot of the surface over the region
- 2 Draw and label the region
- 3 Choose the order of integration
- 4 Compute/Evaluate the "inside" integral
- 5 Compute/Evaluate the "outside" integral

Iterated Integrals Step by Step

- 1 Create a 3D plot of the surface over the region
- 2 Draw and label the region
- 3 Choose the order of integration
- 4 Compute/Evaluate the "inside" integral
- 5 Compute/Evaluate the "outside" integral
- 6 Does the answer make sense?

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Example Using Steps above

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Example Using Steps above

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Fubini's Theorem and Switching the Order of Integration

- $$\iint_R f(x, y) dA = \int_a^b \int_c^d f(x, y) dy dx = \int_c^d \int_a^b f(x, y) dx dy$$

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Some Board Problems

$$1 \quad \int_0^4 \frac{y}{x+2} dy$$

$$2 \quad \int_2^4 \int_{-1}^1 (x^2 + y^2) dy dx$$

$$3 \quad \int_{-1}^1 \int_2^4 (x^2 + y^2) dx dy$$

$$4 \quad \int_0^1 \int_1^2 \frac{xe^x}{y} dx dy$$

$$5 \quad \int_0^2 \int_0^{\pi/2} x \sin y dy dx$$

More Iterated Integrals and Integrating over General Regions

- More Iterated Integrals and Integrating over General Regions.

Questions