

22.06.2018

Ex 1 Evaluate $\iint_A \left(\frac{1}{2} \sin x - y\right) dx dy$, where

$$A = \left\{ (x, y) \mid 0 \leq x \leq \frac{\pi}{2}, \frac{2}{\pi} x \leq y \leq \sin x \right\}$$

Exam

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Ex 2 Evaluate $\iiint_A \frac{e^{-(x^2+y^2+z^2)}}{\sqrt{x^2+y^2+z^2}} dx dy dz$, where

$$A = \left\{ (x, y, z) \mid 4 \leq x^2 + y^2 + z^2 \leq 9, x, y, z \geq 0 \right\}$$

2p **Ex 3** Let γ be the simple parametrized path whose image is $\gamma(\gamma) = \left\{ (x, y, z) \mid z = \sqrt{x^2 + y^2}, x + 2z = 1, x, y \geq 0 \right\}$

a) Find a parametrization of γ using cylinder coordinates

b) Compute $\int_{\gamma} x dz$ using the parametrization found at a)

3p **4** Let $A \subseteq \mathbb{R}^2$ open set, let $Q: A \rightarrow \mathbb{R}$ be a fct. of class C^1 on A and let Δ be a subset of A which is simple to Ox axis.

a) Define the boundary $\partial \Delta$ of Δ oriented in positive sense

b) Prove $\oint_{\partial \Delta} Q(x, y) dy = \iint_{\Delta} \frac{\partial Q}{\partial x}(x, y) dx dy$