

"QUIZ" for Lecture 23

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E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: qXFirstLast.pdf) ASAP BUT NO LATER THAN Dec. 1, 2020, 8:00pm

1. Determine whether or not the vector field is conservative. If it is, find a function f such that $\mathbf{F} = \nabla f$.

$$\mathbf{F}(x, y, z) = (3x^2y^3z^3 + yz)\mathbf{i} + (3x^3y^2z^3 + xz)\mathbf{j} + (3x^3y^3z^2 + xy)\mathbf{k}$$

$$\frac{\partial F_x}{\partial y} = 9x^2y^2z^3 + z = \frac{\partial F_y}{\partial x} = 9x^2y^2z^3 + z \quad \checkmark$$

conservative

$$\frac{\partial F_x}{\partial z} = 9x^2y^3z^2 + y = \frac{\partial F_z}{\partial x} = 9x^2y^3z^2 + y \quad \checkmark$$

$$f = \left\langle \int F_x dx, \int F_y dy, \int F_z dz \right\rangle$$

~~$$f = \langle x^3y^3z^3 + xyz, x^3y^3z^3 + xyz, x^3y^3z^3 + xyz \rangle$$~~

2. Evaluate

$$\int_C 5y dx + 10x dy,$$

where C is the closed curve consisting of the boundary of the rectangle

$$\{(x, y) \mid 0 \leq x \leq 1, 0 \leq y \leq 1\}.$$

$$P = 5y \quad Q = 10x$$

$$\frac{\partial P}{\partial y} = 5 \quad \frac{\partial Q}{\partial x} = 10 \quad 10 - 5 = 5$$

5 * Area = 5 * 1 = 5
↳ (1 * 1)