"QUIZ" for Lecture 19

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E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q19FirstLast.pdf) ASAP BUT NO LATER THAN Nov. 12, 8:00pm

1.

Determine whether or not the vector field

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

is conservative. If it is conservative, find a function f such that $\mathbf{F} = \nabla f$.

$\frac{dP}{dz} = \frac{d}{dz}(y^2z^3) = 2yz^3$

NOT conservative

$\frac{dQ}{dx} = \frac{d}{dx}(2xyz^3) = 2yz^3$

$\frac{dR}{dy} = \frac{d}{dy}(3xy^2z^2) = 6xyz^2$

2. Show that the line integral

$$\int_C 2xy^2\,dx + 2x^2y\,dy \quad ,$$

is independent of the path C, and evaluate it if C is *any* path from $(1,0)$ to $(0,1)$.

$4xy = 4xy$ (first part)

$f(x,y) = x^2y^2 + x^2y^2 = 2x^2y^2 \Big|_{(1,0)}^{(0,1)} = \boxed{0}$