

"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 $\mathbf{F} = \nabla f$.

$$(6xz^2y - 6xyz^2, 3y^2z^2 - 3y^2z^2, 2yz^3 - 2yz^3)$$

$$= 0, 0, 0 \rightarrow \text{conservative!}$$

$$0\mathbf{i} + 2xz^3\mathbf{j} + 6xyz\mathbf{k} \rightarrow \boxed{F = 2xz^3\mathbf{j} + 6xyz\mathbf{k}}$$

2. Show that the line integral \int_C

$$2xy^2 dx + 2x^2y dy$$

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

$$4xy = 4xy \rightarrow \checkmark$$

$$\int_0^1 2y^2 + 2y dy \rightarrow \int_0^1 2y dy \rightarrow y^2 \Big|_0^1 = 1$$

$$2x(1) dx + 2x^2(1)(0) \int_0^1 2x \rightarrow \int_0^1 2x dx \rightarrow x^2 \Big|_0^1 = 1$$

$$1+1 = \boxed{2}$$