"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

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

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

```
i        j        k
d/dx     d/dy     d/dz
y^2z^3   2xyz^3   3xy^2z^2

i(d/dy*3xy^2z^2-d/dz*2xyz^3)-j(d/dx*3xy^2z^2-d/dz*y^2z^3)+k(d/dx*2xyz^3-d/dy*y^2z^3)=0

fx=y^2z^3
f=x*y^2z^3+g(y,z)
fy=2xyz^3
2xyz^3+gy=2xyz^3
gy=0  g(y,z)=h(z)
f=x*y^2z^3+h(z)
fz=3xy^2z^2
3xy^2z^2+h'(z)=3xy^2z^2
h'(z)=0  h(z)=0
f=x*y^2z^3
```

2. Show that the line integral

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

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

```
fx=2xy^2
f=x^2y^2+g(y)
fy=2x^2y
gy=0
g(y)=0
f=x^2y^2
f(1,0)-f(0,1)=0
```