"QUIZ" for Lecture 25

NAME: (print!) Fady Besada **Section:** 22

E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q25FirstLast.pdf) ASAP BUT NO LATER THAN Dec.8,2020, 8:00pm

Let

$$F(x,y,z) =$$

$$\langle \cos(\sqrt{1+x^7}+zy^9) \quad , \quad \tan(x^7+y^2+1/z) \quad , \quad \tan^{-1}(e^{xyz}+\cos^6(x^8-y+3z)) \rangle \quad ,$$

and let $\langle P,Q,R\rangle = curl\ \mathbf{F}$. Compute

$$\frac{\partial P}{\partial x}+\frac{\partial Q}{\partial y}+\frac{\partial R}{\partial z} \quad .$$

Be sure to explain everything.

→ $\frac{dP}{dx} + \frac{dQ}{dy} + \frac{dR}{dz} = 0$

→ The divergence of the curl of a function is always 0.

2. Calculate the surface integral
$\int\int_S \mathbf{F}\cdot d\mathbf{S}$, where

$$\mathbf{F}(x,y,z) = \langle\, 2x+y+z\,,\, x+2y+z\,,\, x+y+2z \,\rangle$$

where S is the surface of the box bounded by the planes $x=0$, $x=1$, $y=0$, $y=4$, $z=0$, $z=5$.

→ $\iint_S F \cdot dS = \iiint_E div(F)\,dV$

→ $E = \{(x,y,z) \mid 0 \le x \le 1,\ 0 \le y \le 4,\ 0 \le z \le 5\}$

→ $P_x = 2$

→ $Q_y = 2$

→ $R_z = 2$

→ $\int_0^5\int_0^4\int_0^1 6\,dx\,dy\,dz = \left(\int_0^1 6\,dx\right)\left(\int_0^4 1\,dy\right)\left(\int_0^5 1\,dz\right) = 120$