"QUIZ" for Lecture 25

NAME: (print!)Liuyang Shan   **Section:** 24

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
$$F(x, y, z) =$$
$$\left(\cos(\sqrt{1 + x^7} + zy_9) \quad , \quad \tan(x_7 + y_2 + 1/z) \quad , \quad \tan^{-1}(e^{xyz} + \cos_6(x_8 - y + 3z))\right) \quad ,$$

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

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

Be sure to explain everything.

$$F = (A, B, C)$$
$$curlF = \left(C_y - B_z, A_z - C_x, B_x - A_y\right)$$
$$div(curlF) = C_{yx} - B_{zx} - A_{zy} - C_{xy} - B_{xz} - A_{yz} = 0$$

2. Calculate the surface integral
$$\iint_S \mathbf{F} \cdot d\mathbf{S}, \text{ where}$$
$$\mathbf{F}(x, y, z) = (\ 2x + y + z\ ,\ x + 2y + z\ ,\ x + y + 2z\ )$$

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

$$\iint FdS = \int_0^1 \int_0^4 \int_0^5 6dz\, dy\, dx = 120$$