**NAME:** (print!) Fayed Raza          **Section:** 24

**E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: qXFirstLast.pdf) ASAP BUT NO LATER THAN Dec. 1, 2020, 8:00pm**

**1.** Determine whether or not the vector field is conservative. If it is, find a function $f$ such that $\mathbf{F} = \nabla f$.

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

It is conservative

$$\left| \begin{array}{ccc} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ \dfrac{\partial}{\partial x} & \dfrac{\partial}{\partial y} & \dfrac{\partial}{\partial z} \\ 3x^2 y^3 z^3 + yz & 3x^3 y^2 z^3 + xz & 3x^3 y^3 z^2 + xy \end{array} \right|$$

$F_x = 3x^2 y^3 z^3 + yz$

$F = x^3 y^3 z^3 + xyz + F_x(y,z)$

$F = x^3 3y^2 z^3 + xz + F_z(z)$          $\left( 9x^2 y^3 z^2 + y - (9x^2 y^3 z^2 + y) \right)\mathbf{i}$

$F_z = 9x^3 y^2 z^2 + x + F_z(z)$          $- \left( 9x^3 y z^2 + x - (9x^3 y^2 z + x) \right)\mathbf{j}$

$F(x,y,z) = 9x^3 y^2 z^2 + x - 3x^3 y^3 z^2 - xy +$          $\left( 9x^2 y^2 z^3 + z - (9x^2 y^2 z^3 + z) \right)\mathbf{k}$

$0\mathbf{i} - 0\mathbf{j} + 0$

**2.** Evalute

$$\int_C 5y\, dx + 10x\, dy \quad ,$$

where $C$ is the closed curve consisting of the boundary of the rectangle

$$\{(x, y) \mid 0 \le x \le 1 \quad , \quad 0 \le y \le 1\}.$$

$10 - 5$

$$\int_0^1 \int_0^1 5\, dy\, dx$$

$$\int_0^1 5\, dx$$

$5$