Math 2120H: Assignment V

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Problem 1. Verify that the below vector field is conservative and find a potential function for $\mathbf{F}$

$$\mathbf{F} = e^{y+2z}\left(\mathbf{i} + x\mathbf{j} + 2x\mathbf{k}\right)$$

Solution 1.

Problem 2. Find a potential function for the field below and evaluate the integral

$$\int_{(1,1,1)}^{(1,2,3)} 3x^2\,dx + \frac{z^2}{y}\,dy + 2z\ln y\,dz$$

Solution 2.

Problem 3. Find the outward flux of the field $\mathbf{F} = xy\mathbf{i} + y^2\mathbf{j}$ over the boundary of the region enclosed by the curve $y = x^2$ and the line $y = x$.

Solution 3.

Problem 4. Apply Green's Theorem to evaluate the integral below

$$\oint 3y\,dx + 2x\,dy, \qquad \text{Where } C \text{ is the boundary of } 0 \le x \le \pi,\ 0 \le y \le \sin x$$

Solution 4.