

9/9 Rahul Paleja

Section 22

① $F(x, y, z) = y^2 z^3 i + 2xyz^3 j + 3xy^2 z^2 k$

$$\left. \begin{aligned} \frac{\partial P}{\partial y} &= 2z^3 y \\ \frac{\partial Q}{\partial x} &= 2yz^3 \end{aligned} \right\} \text{ same, vector field is conservative}$$

$$\frac{dF}{dx} = y^2 z^3 \quad F = \int (y^2 z^3) dx =$$

$$f = xy^2 z^3 + g(y, z)$$

$$\frac{d}{dy} = \frac{2xz^3 y}{y} + g'_y(y, z) = \frac{2xz^3}{1}$$

$$g(y, z) = 0 + h(z)$$

$$f = xy^2 z^3 + h(z)$$

$$f_z = \frac{3xy^2 z^2}{z^2} + h'(z) = \frac{3xy^2 z^2}{z^2}$$

$$h'(z) = 0 \rightarrow h(z) = 0$$

$$F = xy^2 z^3$$

② Show that line integral $\int_C 2xy^2 dx + 2x^2 y dy$ is independent of path C , and evaluate it if C is any path from $(1, 0)$ to $(0, 1)$