

$$\begin{aligned}
1. \text{ Partial } x &= y^2 z^3 \\
\text{Partial } y &= 2xyz^3 \\
\text{Partial } z &= 3xy^2 z^2 \\
\text{Int}(y^2 z^3) &= xy^2 z^3 + g(y, z) \\
\text{Partial } y &= 2xyz^3 + g_y(y, z) \\
f(x, y, z) &= xy^2 z^3 + h(z) \\
f(x, y, z) &= xy^2 z^3 + c
\end{aligned}$$

2. Show that the line integral is independent of path C

Take the partial y of $2xy^2$

Take the partial x of $2x^2y$

$$\text{Partial } y = 4xy$$

$$\text{Partial } x = 4xy$$

$4xy = 4xy$ so line integral is independent from the path C