

Use What You Know in Rectangular Coordinates:

Next, use what you know about the path to find an expression for $d\vec{r}$ along the specific path 4 in the second figure below.

$$d\vec{r} =$$

This is the line element in rectangular coordinates along path 4.

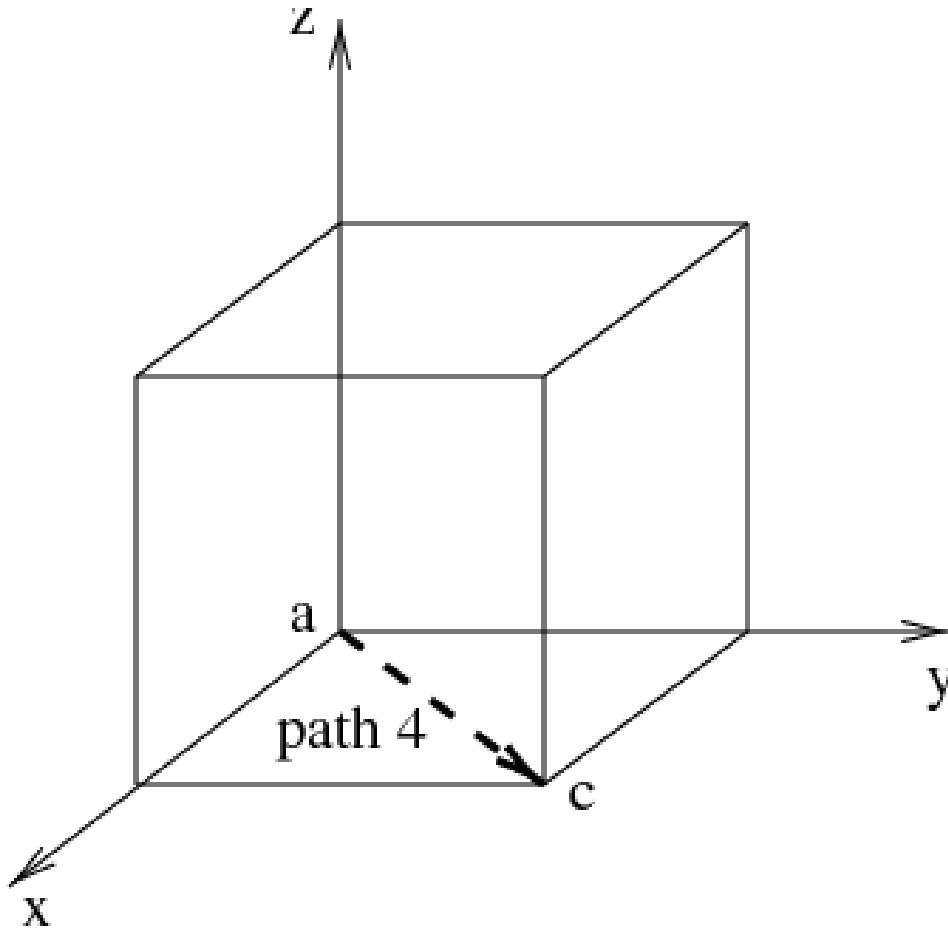


Figure 1: Figure 2: $d\vec{r}$ along path 4

Solution On path 4, $y = x$ and $z = \text{constant}$, which means $dy = dx$ and $dz = 0$. We can plug this information into the general expression for $d\vec{r}$ to obtain:

$$d\vec{r} = dx (\hat{x} + \hat{y}) = dy (\hat{x} + \hat{y})$$