

### 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.

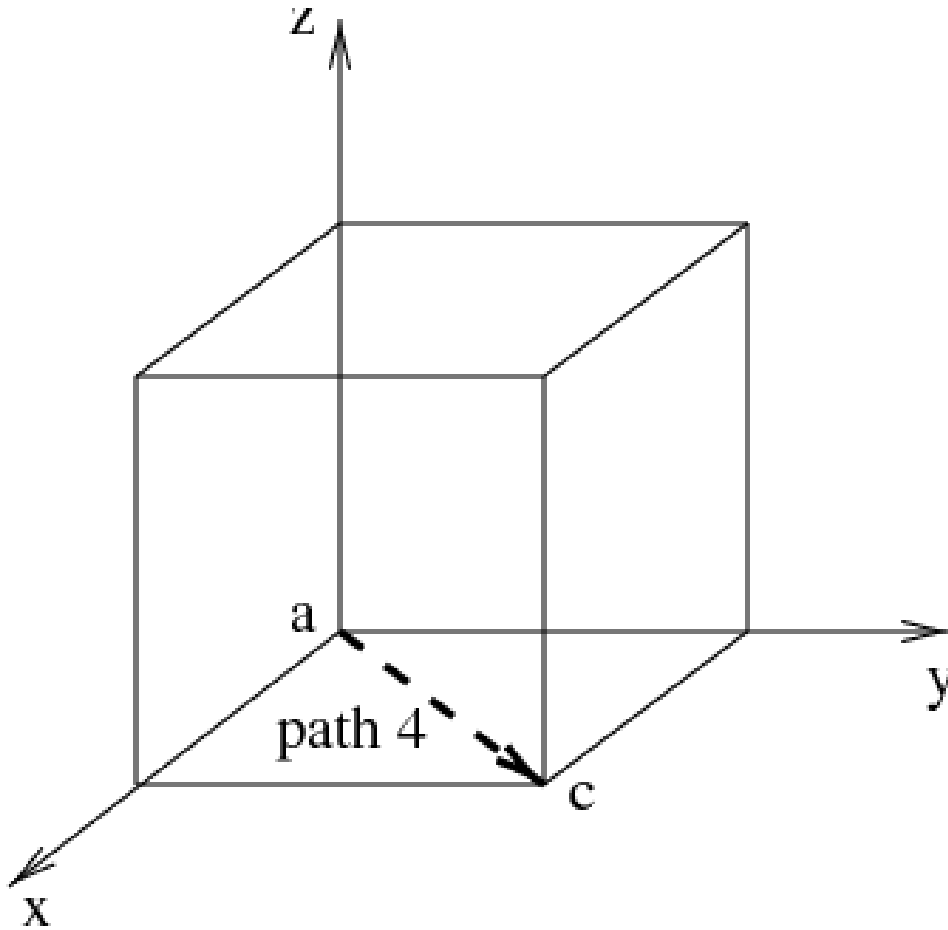


Figure 1: Figure 2:  $d\vec{r}$  along path 4

**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:

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