

```
In[8]:= x = r Cos[t];  
y = r Sin[t];  
T = {x, y, z}
```

```
Out[10]=  
 $\{r \cos[t], r \sin[t], z\}$ 
```

```
In[11]:= Jac = D[T, {{r, t, z}}]  
MatrixForm[Jac]  
Det[Jac]  
Simplify[%]
```

```
Out[11]=  
 $\{\{\cos[t], -r \sin[t], 0\}, \{\sin[t], r \cos[t], 0\}, \{0, 0, 1\}\}$ 
```

```
Out[12]//MatrixForm=  

$$\begin{pmatrix} \cos[t] & -r \sin[t] & 0 \\ \sin[t] & r \cos[t] & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

```

```
Out[13]=  
 $r \cos[t]^2 + r \sin[t]^2$ 
```

```
Out[14]=  
r
```