```
> restart : with(VectorCalculus) : with(LinearAlgebra) :
> J := Jacobian([r·sin(theta)·cos(phi), r·sin(theta)·sin(phi), r·cos(theta)], [r,
      theta, phi])
```

$$J := \begin{bmatrix} \sin(\theta)\cos(\phi) & r\cos(\theta)\cos(\phi) & -r\sin(\theta)\sin(\phi) \\ \sin(\theta)\sin(\phi) & r\cos(\theta)\sin(\phi) & r\sin(\theta)\cos(\phi) \\ \cos(\theta) & -r\sin(\theta) & 0 \end{bmatrix} \quad (1)$$

```
> det := abs(Determinant(J))
```

$$det := \left|\sin(\theta)^3\cos(\phi)^2 r^2 + \sin(\theta)^3\sin(\phi)^2 r^2 + \sin(\theta)\cos(\phi)^2\cos(\theta)^2 r^2 + \sin(\theta)\sin(\phi)^2\cos(\theta)^2 r^2\right| \quad (2)$$

```
> simplify(det)
```

$$|r|^2\,|\sin(\theta)| \quad (3)$$

```
> # et voila ;0
>
```