

$$4. \quad x+y+z=3$$

$$z=3-x-y$$

$$\begin{aligned} \vec{r}(u,v) &= x\vec{i} + y\vec{j} + z\vec{k} \\ &= (u\vec{i} + v\vec{j} + (3-u-v)\vec{k}) \end{aligned}$$

$$5. \quad x = \sqrt{9y^2 + z^2}$$

$$\begin{aligned} \vec{r}(u,v) &= x\vec{i} + y\vec{j} + z\vec{k} \\ &= \sqrt{9y^2 + z^2}\vec{i} + y\vec{j} + z\vec{k} \end{aligned}$$

$$= \sqrt{(3y)^2 + (z)^2} + y\vec{j} + z\vec{k}$$

\downarrow \downarrow
 $3y = u \cos v$ $z = u \sin v$

$$= \sqrt{(u \cos v)^2 + (u \sin v)^2}\vec{i} + \frac{1}{3}u \cos v\vec{j} + u \sin v\vec{k}$$

$$= \sqrt{u^2 \cos^2 v + u^2 \sin^2 v}\vec{i} + \frac{1}{3}u \cos v\vec{j} + u \sin v\vec{k}$$

$$= \sqrt{u^2 (\cos^2 v + \sin^2 v)}\vec{i} + \frac{1}{3}u \cos v\vec{j} + u \sin v\vec{k}$$

$$= (u\vec{i} + \frac{1}{3}u \cos v\vec{j} + u \sin v\vec{k})$$

$$6. \quad x^2 + y^2 = 36$$

$$\frac{x^2}{36} + \frac{y^2}{36} = 1$$

$$\frac{1}{36}x^2 + \frac{1}{36}y^2 = 1$$

$$\left(\frac{1}{6}x\right)^2 + \left(\frac{1}{6}y\right)^2 = 1$$

$$(\cos u)^2 + (\sin u)^2 = 1$$

$$z = v$$

$$\frac{1}{6}x = \cos u \quad \frac{1}{6}y = \sin u$$

$$x = 6 \cos u \quad y = 6 \sin u$$

$$\vec{r}(u,v) = 6 \cos u\vec{i} + 6 \sin u\vec{j} + v\vec{k}$$