Let

$$f(x, y) = y \cos x.$$

Find the points on the graph of f where the tangent plane is parallel to the plane

$$x - \sqrt{3}\, y + 2z = -2.$$

$\frac{\partial f}{\partial x} = -y \sin x \qquad \frac{\partial f}{\partial y} = \cos x$

Normal vector to the tangent plane is $\vec{T} = (-y \sin x)\vec{\imath} + (\cos x)\vec{\jmath} - \vec{k}$

Normal vector to plane is $\vec{N} = \vec{\imath} - \sqrt{3}\,\vec{\jmath} + 2\vec{k}$

The planes are parallel if $\vec{T}$ and $\vec{N}$ are parallel, i.e., $\vec{T} = \lambda \vec{N}$ for some scalar λ. We have

$$\begin{cases} -y \sin x = \lambda \\ \cos x = -\sqrt{3}\,\lambda \\ -1 = 2\lambda \end{cases}$$

$\Rightarrow \lambda = -1/2 \Rightarrow \cos x = \frac{\sqrt{3}}{2} \Rightarrow \sin x = \pm \frac{1}{2}$.
We have $x = \pm \frac{\pi}{6} + 2k\pi$. If $x = \frac{\pi}{6} + 2k\pi$, then $y = 1$, and the point is $(\frac{\pi}{6} + 2k\pi, 1, \frac{\sqrt{3}}{2})$.
If $x = -\frac{\pi}{6} + 2k\pi$, then $y = -1$ and the point is $(-\frac{\pi}{6} + 2k\pi, -1, -\frac{\sqrt{3}}{2})$.