Ex: Find a normal vector of the plane or the direction vector of the line.

1) Plane including point $P = (1, 2, -3)$ and including line $L: \begin{cases} x = 1 \\ y = -2t \\ z = 1 + t \end{cases}$.

L has direction $\vec{u} = \langle 0, -2, 1 \rangle$ and point $(1, 0, 1)$

Find $\vec{n}$

$\vec{n} = \langle 0, -2, 1 \rangle \times \vec{QP}$ where $Q = (1, 0, 1)$

$$= \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & -2 & 1 \\ 0 & 2 & -4 \end{vmatrix} = \boxed{\langle 6, 0, 0 \rangle}.$$

2) Plane $\perp$ to line $\frac{x}{3} = y + 1 = \frac{z+2}{-1}$.

$\vec{n} = \vec{u}$ of line! line: $t = \frac{x}{3}$, $t = y + 1$, $t = \frac{z+2}{-1}$

$\boxed{\vec{n} = \langle 3, -1, -1 \rangle}$ $\Rightarrow \begin{cases} x = 3t \\ y = -1 + t \\ z = -t - 2 \end{cases}$

3) Line $\perp$ to plane $3x - y + \frac{1}{2}z = 2$

Find $\vec{u} = \vec{n} = \boxed{\langle 3, -1, \frac{1}{2} \rangle}$