Then $x = \lambda_1 v_1 + U$ and

$y = \lambda_2 v_1 + U$, for some $\lambda_1, \lambda_2 \in \mathbb{F}$.

Thus $\pi_1(x+y) = \pi_1(\lambda_1 v_1 + U + \lambda_2 v_1 + U)$

$= \pi_1((\lambda_1 + \lambda_2) v_1 + U)$

$= \lambda_1 + \lambda_2$

$= \pi_1(x) + \pi_1(y)$

$\Rightarrow$ satisfy addivity. ✓

$\pi_1(\lambda x) = \pi_1(\lambda[\lambda_1 v_1 + U])$

$= \pi_1(\lambda \lambda_1 v_1 + U)$

$= \lambda \lambda_1$

$= \lambda \pi_1(x)$

$\Rightarrow$ satisfy homogeneity ✓

- $\pi_1(U) = 0$ (by definition)