Eg: Let $(G, *) = (\mathbb{R}^2, +)$ be a gp.
and $H = \{(x, 0) : x \in \mathbb{R}\} < G$

Solⁿ: $(1,2) * H = \{(1,2) + h : h \in H\}$
$= \{(1,2) + (x,0) : x \in \mathbb{R}\}$
$= \{(x+1, 2) : x \in \mathbb{R}\}$

$= \{(y, 2) : y \in \mathbb{R}\}$
$(1,2) * H = \{(x, 2) : x \in \mathbb{R}\}$
$= H * (1,2)$

QUOTIENT SPACE:

Let $V(\mathbb{F})$ be a V.S. and W be a subsp. of V
Then, define $\frac{V}{W} = \{ a + W : a \in V\}$
int. op.
= set of all possible cosets of W

- $(\frac{V}{W}, +, \cdot)$ is a V.S. with the operations
  $+ : \frac{V}{W} \times \frac{V}{W} \rightarrow \frac{V}{W}$ s.t.
  $+ : (a+W, b+W) = (a+W) + (b+W)$
  $= (a+b) + W$

  $\cdot : \mathbb{F} \times \frac{V}{W} \rightarrow \frac{V}{W}$ s.t. $\alpha \cdot (a+W) = \alpha \cdot a + W$.

$(\frac{V}{W}, +, \cdot)$ is known as V.S. $\Rightarrow$ QUOTIENT SP
of V related to W.

- zero element of $\frac{V}{W}$ is $0 + W = W$
- inverse element of $a + W \in \frac{V}{W}$ is $-a + W$