Subspace :-

A non-empty subset W of a VS V is said to be a subspace of V if W is itself a vectorspace under the addition and scalar multiplication defined on V.

* $u, v \in W$ then $\alpha u + \beta v \in W$.

Ex:-1 $V = C[a,b]$

$W = C'[a,b]$

$\alpha f + bg \in W$

Ex:-2 $\mathbb{R}^2(\mathbb{R})$

$S = \{\cancel{(x+1, y) : (x,y) \in \mathbb{R}^2}\}$ $\{(x,y) \in \mathbb{R}^2 : (x+1, y)\}$

$\alpha(\cancel{x_1, y_1) + \beta(x_2, y_2}) = \cancel{(\alpha x_1, \alpha y_1) + (\beta x_2, \beta y_2)}$

$= \cancel{(\alpha x_1 + 1, \alpha y_1) + (\beta x_2 + 1, \beta y_2)}$

$= \cancel{(\alpha x_1 + \beta x_2 + 2, \alpha y_1 + \beta y_2)}$

$= (\alpha x_1 + \beta x_2 + 1 + 1, \alpha y_1 + \beta y_2) \in S$

$\alpha u + \beta v = \alpha(x_1 + 1, y_1) + \beta(x_2 + 1, y_2)$

$= (\alpha x_1 + \alpha, \alpha y_1) + (\beta x_2 + \beta, \beta y_2)$

$= (\alpha x_1 + \beta x_2 + \alpha + \beta, \alpha y_1 + \beta y_2) \notin S.$