Ex:-3 $P_n(x)$ = Set of all polynomials of degree $\le n$.

$\mathbb{F} = \mathbb{R}$.

Let $p(x), q(x) \in P_n(x)$

$p(x) = a_0x^n + a_1x^{n-1} + \dots + a_n$

$q(x) = b_0x^n + b_1x^{n-1} + \dots + b_n$

$P_n(x)(\mathbb{R})$ is a V.S.

Ex:-4 $S = \{$ The set of polynomials of degree $n\}$, $\mathbb{F} = \mathbb{R}$

Not satisfying closure property.

So $S(\mathbb{R})$ is not a vector space.

let $p(x) = a_0x^n + a_1x^{n-1} + \dots + a_n$

$q(x) = -a_0x^n + b_1x^{n-1} + \dots + b_n$

$p+q = c_1x^{n-1} + \dots + c_n \notin S$.

Ex:-5 $\mathbb{R}^+(\mathbb{R})$

$u+v = u\cdot v$

$\alpha u = u^\alpha$

$\cancel{0+v = 0\cdot v = 0 \notin \mathbb{R}^+}$

(1) $u \in \mathbb{R}^+$

$v \in \mathbb{R}^+$

$u+v = u\cdot v \in \mathbb{R}^+$

(2) $(u+v)+w = uvw$

$u+(v+w) = uvw$

(3) $u \in \mathbb{R}^+$

$1 \in \mathbb{R}^+$

$u+1 = u\cdot 1 = u$.

(4) $u \in \mathbb{R}^+$

$\frac{1}{u} \in \mathbb{R}^+$