Ex:-7 $AX = b$

$A_{m\times n}$, $m < n$

Soln set of this system is a V.S or not with gen. add^n & mult^n.

Here X can not be a null vector.

So identity doesn't exists.

∴ It is not a V.S.

Closure property also not hold. As $X_1, X_2 \in S$ $A(X_1+X_2) = AX_1 + AX_2 = b+b = 2b$

Ex:-8 $AX = b = 0$

Soln of this system form a V.S. *(Associative property)

Ex:-9 $AX = b$

$A_{m\times n}$, $m = n$

Soln set of this system is not a V.S.

Ex:-10 S = set of matrices of order $m\times n$, $F \in \mathbb{R}$.

is VS under add^n & scalar mul^n

Ex:-11 S = set of symmetric matrice

" diagonal "

" upper triangular "

" lower triangular " form V.S.

Ex:-12 Set of fun's, cont. fun^n, derivable fun's forms VS.

$C^1[a,b]$ → One time differentiable cont. fun^n in $[a,b]$

$C^2[a,b]$ → Two times " " " .

$$C[a,b] \supseteq C^1[a,b] \supseteq C^2[a,b] \supseteq \dots \supseteq C^\infty[a,b] \supseteq P_n(x)$$

All these are Vector Spaces.