

### 309 Worksheet 1.4

*True or False? Justify your answer:*

Let  $V$  be a vector space.

(1)  $\{\mathbf{0}\}$  and  $V$  are subspaces of  $V$ .

True — False?

REASON:

(2) Let  $S \subseteq T \subseteq V$  be subsets of  $V$  with  $T$  a subspace of  $V$ .  $S$  is a subspace of  $V$  if and only if  $S$  is a subspace of  $T$ .

True — False?

REASON:

(3) Let  $S \subseteq T \subseteq V$  be subsets of  $V$ . If  $S$  is a subspace of  $V$  then  $S$  is a subspace of  $T$ .

True — False?

REASON:

(4) Let  $S \subseteq T \subseteq V$  be subsets of  $V$ . If  $S$  is a subspace of  $V$  then  $T$  is a subspace of  $V$ .

True — False?

REASON:

(5) For all  $n \in \mathbb{N} - \{0\}$ ,  $\mathbb{P}_{n-1}$  is a subspace of  $\mathbb{P}_n$ .

True — False?

REASON:

(6) A subset  $S$  of  $V$  is a subspace of  $V$  if the following conditions are satisfied: (i) the zero vector of  $V$  is in  $S$ , and if  $\mathbf{u}, \mathbf{v}$  are vectors then (ii)  $\mathbf{u} + \mathbf{v}$  are in  $S$ , and (iii)  $c\mathbf{u}$  is in  $S$  for any scalar  $c$ .

True — False?

REASON: