

1) \mathbb{R}^n is a vector space over \mathbb{R} .
 Basis: $\{e_1, \dots, e_n\}$
 Dimension: n

2) \mathbb{R}^n is a vector space over \mathbb{C} .
 Basis: $\{e_1, \dots, e_n\}$
 Dimension: $n/2$

\mathbb{R}	\mathbb{C}	\mathbb{R}
P	0	5
P	2	7
P	4	6
P	7	2

3) Let V be a vector space over \mathbb{R} with dimension $n \geq 2$.
 Let S, Q, T be linear transformations on V .
 Suppose $S^2 = Q$ and $T^2 = S$.
 Prove that $Q = T$.

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F 0

1) a) $f \in O(g)$

$f \in O(g)$ (b) -d

b) $f \in O(n)$

$f \in O(n)$, w

$$f(n) = \left\{ \begin{array}{ll} n^2 - n, & n \leq 3 \\ 5n + 7, & n > 3 \\ 4n, & n > 3 \end{array} \right\}.$$

2) $f \in O(g)$

1) a) b

$f \in O(g)$

a) $f \in O(g)$

b) $f \in O(g)$

c) $f \in O(g)$

d) $f \in O(g)$

e) $f \in O(g)$

f) $f \in O(g)$

3) $f \in O(g)$

`int CountKey(treeptr *p, int keyval);`

`if (p == NULL)`

`return 0;`
if (p->key == keyval)

`return 1;`

Theory Exam

Answer **ANY TWO** of the following three questions:

1. Provide a context-free grammar that generates the following language over $\Sigma = \{0,1\}$:

$$\{ = 0^*1^* : | \text{ is odd} \}$$

2. A clique in an undirected graph is a subgraph wherein every two nodes are connected by an edge. Consider the language:

3CLIQUE } { P r o Y T W Q U E }