Jan 2022

$Q1$. From the list of given terms find out the best possible options for each of the given subquestions:

1) Rank 2) Limit 3) Determinant 4) Closure with respect to addition and scalar multiplication 5) Existence of zero element 6) Existence of additive inverse 7) Communitative of addition 8) Associativity of addition 9) Elements 10) Local maxima 11) Local minima 12) Saddle points 13) Gradient 14) Directional Derivative 15) Partial Derivative 16) Set of orthonoraml vectors 17) Standard ordered basis 18) Affine spaces

The conditions that need to be checked to identify a subspace W of a vector space V :_____.
(Enter 2 best possible options. Enter only the serial numbers of those options in increasing order
without adding any comma or space in between them.) [Suppose your answer is 7, 14 and 17, then
you should enter 71417]

Jan 2023

$Q2$. From the list of given terms find out the best possible options.

1) Rank 2
2) Non-zero nullity
3) Non -zero determinant
4) Closure with respect to addition and scalar multiplication
5) Existence of addititve inverse
6) Existence of additive inverse
7) Commutative of addition
8) Associativity of addition
9) Elements
10) Global maxima
11) Global minima
12) A critical points
13) Gradient exists
14) Directional derivative exist in any direction
15) Partial derivatives exist
16) Orthonormal columns
17) Standard ordered basis
18) Affine subspaces
19) Limit exists

Some of the conditions that need to be checked to identify a vector space V are _____ .
(Enter 5 best possible options. Enter only the serial numbers of those options in increasing order
without adding any comma or space in between them.) [Suppose your answer is 7, 14, 11, 15 and
17, then you should enter 714111517]

May 2023

$Q3$. Let V be the vector space of all $n \times n$ matrices with usual addition and scalar multiplication. Which of the following set(s) form an subspace of V ?

Options:

A. $W_1 = \left\{A \in M_n(\mathbb{R}) : A \text{ is invetible}\right\}$

B. $W_2 = \{A \in M_n(\mathbb{R}) : det(A) = 1\}$

C. $W_3 = \left\{A \in M_n(\mathbb{R}) : A \text{ is upper triangular}\right\}$

D. $W_1 = \left\{A \in M_n(\mathbb{R}) : A \text{ is symmetrix i.e. } A^T = A\right\}$