Started on	Thursday, 16 December 2021, 3:55 PM
State	Finished
Completed on	Thursday, 16 December 2021, 4:20 PM
Time taken	24 mins 37 secs
Marks	5.00/5.00
Grade	**10.00** out of 10.00 (**100**%)

Question **1**

Correct

Mark 1.00 out of 1.00

Every non zero linear transformation between finite dimensional vector spaces has a right inverse.

Select one:

- True
- False ✔

The correct answer is 'False'.

Question **2**

Correct

Mark 1.00 out of 1.00

Let P(x) denote the vector space of all polynomials with real coefficients of degree at most four. Let

$$T : P(x) \longrightarrow \mathbb{R}^6$$

be a linear map. Then

$$\dim(\ker(T)) \neq \operatorname{rank}(T).$$

Select one:

- True ✔
- False

The correct answer is 'True'.

Question **3**

Correct

Mark 1.00 out of 1.00

Let

$$T : \mathbb{R}^4 \longrightarrow \mathbb{R}^4$$

be an isomorphism. Suppose that there is a non zero vector v such that

$$T(v) = av$$

for some scalar a. Then

$$\operatorname{rank}(T - aI) < 4.$$

Select one:

- True ✔
- False

The correct answer is 'True'.

Question **4**

Correct

Mark 1.00 out of 1.00

Let V be a finite dimensional vector space and

$$T : V \longrightarrow V$$

a linear map. Then there is a vector space W and linear maps

$$T_1 : V \longrightarrow W, \quad T_2 : W \longrightarrow V$$

such that

$$T_1$$

is surjective,

$$T_2$$

is injective and

$$T = T_2 \circ T_1.$$

Select one:

- True ✔
- False

The correct answer is 'True'.

Question **5**

Correct

Mark 1.00 out of 1.00

Let

$$T : \mathbb{R}^2 \longrightarrow \mathbb{R}^2$$

be a linear transformation such that

$$T(1,2)^t = (2,3)^t, \quad T(0,1)^t = (1,4)^t.$$

Then

a. $T(x,y)^t = (-4x + 5y, y)^t$

b. $T(x,y)^t = (-5x + 4y, y)^t$

c. $T(x,y)^t = (y, -5x + 4y)$ ✔

d. $T(x,y)^t = (x, -5x + 4y)^t$

Your answer is correct.

The correct answer is:

$$T(x,y)^t = (y, -5x + 4y)$$

◄ Recording of discussion - 16 December 2021

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