Question **1**

Correct

Marked out of 1.50

Flag question

If $A$ is a $3 \times 3$ matrix with $nullity(A) = 0$, then $Ax = (1, 2, 3)^T$ has infinite number of solutions.

Select one:

- True
- False ✔

The correct answer is: False

Question **2**

Correct

Marked out of 1.50

Flag question

If $S$ is an $n \times n$ transition matrix between two bases for a vector space $V$, $\dim(V) = n > 0$, then $\text{nullity}(S) = n$

Select one:

- False ✔
- True

The correct answer is: False

Question **3**

Correct

Marked out of 1.50

Flag question

Let $E = [(1,2)^T, (3,7)^T]$ and $F = [(1,-2)^T, (3,-5)^T]$ be two ordered bases for $\mathbb{R}^2$. Then the **transition matrix** from $F$ to $E$ is

Select one:

- $\begin{bmatrix} -5 & 3 \\ 2 & -1 \end{bmatrix} \begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$
- $\begin{bmatrix} 7 & -3 \\ -2 & 1 \end{bmatrix} \begin{bmatrix} 1 & 3 \\ -2 & -5 \end{bmatrix}$ ✔
- $\begin{bmatrix} -5 & -3 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$
- $\begin{bmatrix} 7 & -3 \\ -2 & 1 \end{bmatrix} \begin{bmatrix} 1 & 3 \\ 2 & 5 \end{bmatrix}$

The correct answer is: $\begin{bmatrix} 7 & -3 \\ -2 & 1 \end{bmatrix} \begin{bmatrix} 1 & 3 \\ -2 & -5 \end{bmatrix}$

Question **4**

Correct

Marked out of 1.50

Flag question

A basis for the row space of $A = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \\ 1 & 2 & 2 \end{bmatrix}$ is

Select one:

- $\{(1,0,0)^T, (0,1,1)^T\}$ ✔
- $\{(1,1,1)^T\}$
- $\{(1,1,1)^T, (0,1,1)^T, (1,2,2)^T\}$
- $\{(0,1,1)^T, (0,2,2)^T$

The correct answer is: $\{(1,0,0)^T, (0,1,1)^T\}$

Question **5**

Incorrect

Marked out of 1.50

Flag question

If $A$ is a matrix of the form $\begin{bmatrix} a & -b \\ b & a \end{bmatrix}$, where $a, b \in \mathbb{R}$, then $rank(A) = 2$.

Select one:

- False
- True ✖

Question **6**

Correct

Marked out of 1.50

Flag question

The **transition matrix** from the ordered basis $[1+x, 1, 1+x+x^2]$ to the standard basis $[1, x, x^2]$ is

Select one:

- $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}$
- $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}$ ✔
- $\begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$
- $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$

The correct answer is: $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}$

Question **7**

Correct

Marked out of 1.50

Flag question

The rank of $A = \begin{bmatrix} 1 & 1 & 2 & 2 & 3 \\ 2 & -1 & 2 & 1 & 4 \\ 3 & 0 & 4 & 3 & 7 \end{bmatrix}$ is

Select one:

- $4$
- $1$
- $2$ ✔
- $3$

The correct answer is: $2$

Question **8**

Correct

Marked out of 1.50

Flag question

The coordinates of $p(x) = 2x^2 + 3x - 4$ with respect to the ordered basis $F = [1, 1 + x, 1 - x^2]$ is

Select one:

- $(-3, -3, 2)^T$
- $(-5, 3, -2)^T$ ✔
- $(1, -3, -2)^T$
- $(-9, 3, 2)^T$

The correct answer is: $(-5, 3, -2)^T$

Question **9**

Correct

Marked out of 1.50

Flag question

We cannot find a $7 \times 7$ matrix $A$ with $rank(A) = nullity(A)$.

Select one:

- False
- True ✔

Question **9**

Correct

Marked out of 1.50

Flag question

We cannot find a $7 \times 7$ matrix $A$ with $rank(A) = nullity(A)$.

Select one:

- False
- True ✔

The correct answer is: True

Question **10**

Correct

Marked out of 1.50

Flag question

If $A$ is an $n \times n$ singular matrix, then $rank(A) \leq n - 1$.

Select one:

- True ✔
- False

The correct answer is: True