Question 1

Incorrect

Marked out of 1.50

Flag question

If A is a 3×3 matrix such that $N(A) = \{0\}$, and $b = \begin{bmatrix} 1 \\ 3 \\ 2 \end{bmatrix}$, then the system $Ax = b$

Select one:

- has an infinite number of solutions. ✖
- is either inconsistent or has an infinite number of solutions.
- has exactly one solution.
- has at most one solution.

The correct answer is: has exactly one solution.

Question **2**

Incorrect

Marked out of 1.50

Flag question

The null space of $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 0 & 1 \\ 2 & 1 & 2 \end{bmatrix}$ is

Select one:

- $\{(0, -\alpha, -\alpha)^T : \alpha \in \mathbb{R}\}$
- $\{(0, \alpha, \alpha)^T : \alpha \in \mathbb{R}\}$ ✖
- $\{(0, 0, \alpha)^T : \alpha \in \mathbb{R}\}$
- $\{(-\alpha, 0, \alpha)^T : \alpha \in \mathbb{R}\}$

The correct answer is: $\{(-\alpha, 0, \alpha)^T : \alpha \in \mathbb{R}\}$

Question **3**

Incorrect

Marked out of 1.50

Flag question

The set of all 2×2 matrices of the form $\begin{bmatrix} a & 1 \\ 0 & b \end{bmatrix}$ with the standard matrix addition and scalar multiplication is a vector space.

Select one:

- True ✖
- False

The correct answer is: False

Question **4**

Correct

Marked out of 1.50

Flag question

If S is a subspace of a vector space V, then $0 \in S$.

Select one:

- False
- True ✔

The correct answer is: True

Question **5**

Incorrect

Marked out of 1.50

Flag question

One of the following sets is a subspace of $\mathbb{R}^{3\times 3}$

Select one:

- All 3×3 diagonal matrices
- All 3×3 elementary matrices
- All 3×3 triangular matrices ✖
- All 3×3 nonzero matrices

The correct answer is: All 3×3 diagonal matrices

Question **6**

Correct

Marked out of 1.50

Flag question

The vectors $\{2, x, \sin x\}$ in $C[0, 2\pi]$ are a spanning set for $C[0, 2\pi]$.

Select one:

- True
- False ✔

Question **7**

Correct

Marked out of 1.50

Flag question

The vectors $1, x, x^2, x^2 + x - 1$ span P_3.

Select one:

- True ✔
- False

The correct answer is: True

Question **8**

Correct

Marked out of 1.50

Flag question

One of the following is a subspace of $\mathbb{R}^2$

Select one:

- $S = \{(x - y, 1) : \ x, y \in \mathbb{R}\}$
- $S = \{(-x, -y) : \ x, y \in \mathbb{R}\}$ ✔
- $S = \{(x^2, y^2) : \ x, y \in \mathbb{R}\}$
- $S = \{(-x - 1, -y - 1) : \ x, y \in \mathbb{R}\}$

The correct answer is: $S = \{(-x, -y) : \ x, y \in \mathbb{R}\}$

Question **9**

Correct

Marked out of 1.50

Flag question

Every set of three vectors in $\mathbb{R}^3$ spans $\mathbb{R}^3$.

Select one:

- False ✔
- True

The correct answer is: False

Question **10**

Correct

Marked out of 1.50

Flag question

The set $\left\{B \in \mathbb{R}^{2\times 2} : AB + B = O\right\}$ is not a subspace of $\mathbb{R}^{2\times 2}$, where $A \in \mathbb{R}^{2\times 2}$.

Select one:

- True
- False ✔

The correct answer is: False