

Math 254-02 Fall 2006 Embedded Questions

1. Carefully define the term “basis”. Give two examples in \mathbb{R}^2 .
2. Consider the linear mapping $f : \mathbb{R}^3 \rightarrow \mathbb{R}^4$ given by $f(x, y, z) = (x - y, y - z, z - x, x + z - 2y)$. Represent f as a matrix multiplication.
3. Use Gaussian elimination to put $\begin{bmatrix} 2 & 4 & 5 & 6 \\ 0 & 0 & 1 & 2 \\ 1 & 2 & 3 & 4 \end{bmatrix}$ into echelon form.
4. Find all solutions to the following system of linear equations.

$$\begin{aligned} 4u - 3w &= 0 \\ -2u + 3v + 2w &= -1 \\ 6u - 6v - 6w &= 1 \end{aligned}$$

Student Performance on Embedded Questions

Question	Right	Partially Right	Wrong
1	85%	15%	0%
2	85%	15%	0%
3	85%	8%	8%
4	77%	15%	8%

Note: $n = 13$; Percentages may not add to 100% due to rounding.