MATH2270-004

NAME:

Midterm 2 Answers

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Instructions: Do all the problems on **both sides** of each page. Show all your work and box your answers. If you get stuck on a problem, skip it and come back to it at the end.

1. $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$
2. Any 2×2 matrix with determinant 6 will do.
3. (a) $\begin{bmatrix} -2 \\ 3 \\ 1 \\ 0 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} -1 \\ 1 \\ 0 \\ -4 \\ -5 \\ 1 \end{bmatrix}$
   (b) $\begin{bmatrix} 1 \\ 1 \\ 1 \\ -3 \end{bmatrix}, \begin{bmatrix} 1 \\ -1 \\ 1 \\ 4 \end{bmatrix}, \begin{bmatrix} 1 \\ -3 \\ 4 \\ -2 \end{bmatrix}, \begin{bmatrix} -1 \\ 2 \\ -3 \\ 2 \end{bmatrix}$
   (c) The pivot rows of the row reduced matrix.
4. (a) $\begin{bmatrix} 1 \\ 3 \end{bmatrix}$
   (b) $\begin{bmatrix} -3 \\ 9 \end{bmatrix}$
   (c) $\begin{bmatrix} -6 \\ 4 \end{bmatrix}$
   (d) Yes
   (e) $\begin{bmatrix} 1 & -3 & -6 \\ 3 & 9 & 4 \end{bmatrix}$
   (f) $\begin{bmatrix} 1 & -1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$
5. (a) $8, 0$
   (b) $3, 5$
6. No
7. 16
8. Many correct answers. One possible answer is $\{1 + t^2, t, -1\}$.
9. Many correct answers. Any matrix with linearly independent columns which isn't symmetric.
10. Yes.