

Math 251-DX02
Test 2

SUBMISSION DEADLINE: 4:30pm Pacific Time
Submit on D2L

Number of Questions: 5
Total Marks: 16

Show all your work for full marks.

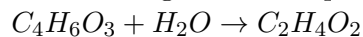
You MAY use the course website (notes, videos etc) and your own notes

You may NOT copy from others (classmates, tutors, Chegg etc)

Submit jpg or pdf files

Feel free to handwrite your solutions and take photos of your work

1. [2 marks] Write down the system of equations you would solve to balance the following chemical equation. **Do not solve the system.**



2. [4 marks] Write $\mathbf{w} = [44, -13, 107]$ as a linear combination of $\mathbf{u} = [1, -2, 3]$ and $\mathbf{v} = [2, 1, 4]$, or state that it is not possible to do so. Show all your work.

3. [3 marks] Solve
$$\begin{bmatrix} 1 & 0 & 0 \\ -2 & 1 & 0 \\ 3 & 4 & 1 \end{bmatrix} \begin{bmatrix} 3 & 1 & -3 \\ 0 & 2 & 6 \\ 0 & 0 & -9 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -2 \\ 6 \\ -25 \end{bmatrix}$$

4. [3 marks] A is a 2×2 matrix. The following sequence of row operations turns A into I . Write A as a product of elementary matrices.

R_2 is replaced with $R_2 - 3R_1$

R_1 is divided by 4

5. [4 marks] Let $A = \begin{bmatrix} 2 & -3 \\ 1 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -6 \\ 8 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} 3 & 4 \\ -5 & 1 \end{bmatrix}$.
Compute $22A^{-1} - A^T + BC$.