Math 251 X02
Assignment 2

Covers: Sections 2.3, 2.4, 3.1, 3.2
Due: Thurs Oct 16 at 11:30am

INSTRUCTIONS:
This assignment will be marked for completion.
Solutions will be posted on the course website 24 hours after the deadline.
You may not copy the work of another person or AI.
Submit jpg or pdf files to the D2L Dropbox.

1. Write $\mathbf{w} = \begin{bmatrix} 8 \\ 21 \\ 15 \end{bmatrix}$ as a linear combination of $\mathbf{u} = \begin{bmatrix} 2 \\ 3 \\ 5 \end{bmatrix}$ and $\mathbf{v} = \begin{bmatrix} 4 \\ -3 \\ 5 \end{bmatrix}$,

or show that it is not possible to do so.

2. Are the vectors below linearly dependent? If so, write one of them as a linear combination of the others:

$$\mathbf{u} = \begin{bmatrix} 1 \\ 2 \\ 5 \end{bmatrix}, \mathbf{v} = \begin{bmatrix} 2 \\ 3 \\ 6 \end{bmatrix}, \mathbf{w} = \begin{bmatrix} 3 \\ 4 \\ 7 \end{bmatrix}$$

3. Set up but DO NOT SOLVE a system of equations.

A coal mining company owns three different mines. Each day, Mine A produces 9 tons of anthracite, 4 tons of ordinary coal and 3 tons of bituminous coal. Each day, Mine B produces 8 tons of anthracite, 5 tons of ordinary coal and 6 tons of bituminous coal. Each day, Mine C produces 7 tons of anthracite, 4 tons of ordinary coal and 7 tons of bituminous coal. For how many days must each of the three mines be operated to produce exactly 334 tons of anthracite, 184 tons of ordinary coal and 230 tons of bituminous coal?

4. Let $A = \begin{bmatrix} 6 & -4 \\ 1 & 3 \end{bmatrix}, B = \begin{bmatrix} 2 & -5 \\ 7 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} 3 & 5 \\ -4 & 1 \end{bmatrix}$.

Compute $(A - 7I)^T - BC$.

5. Find the general form of $\mathrm{span}(\begin{bmatrix} 1 & 1 \\ 9 & 4 \end{bmatrix}, \begin{bmatrix} 2 & 1 \\ 18 & 6 \end{bmatrix})$.