Review

Problem 1: Input a 3x4 matrix of your choice, display it in nice matrix form, then RREF it and display the reduced form nicely. See Mathematica Homework 2 for help.

Problem 2: Using your 3x4 matrix from above, pick off the 1st column, the 2nd row, and the 3-4 entry. Again, see Mathematica Homework 2 for help.

```
In[ ]:=  A={{1,8,9,2},{5,3,8,7},{3,6,1,4}}
         MatrixForm[A]
         MatrixForm[RowReduce[A]]
```

Out[ ]=

{{1, 8, 9, 2}, {5, 3, 8, 7}, {3, 6, 1, 4}}

Out[ ]//MatrixForm=

$$\begin{pmatrix} 1 & 8 & 9 & 2 \\ 5 & 3 & 8 & 7 \\ 3 & 6 & 1 & 4 \end{pmatrix}$$

Out[ ]//MatrixForm=

$$\begin{pmatrix} 1 & 0 & 0 & \frac{95}{74} \\ 0 & 1 & 0 & \frac{1}{74} \\ 0 & 0 & 1 & \frac{5}{74} \end{pmatrix}$$

```
In[ ]:=  A[[All,1]]
         A[[2,All]]
         A[[3,4]]
```

Out[ ]=

{1, 5, 3}

Out[ ]=

{5, 3, 8, 7}

Out[ ]=

4

••• Thread: Objects of unequal length in {1, 2, 3} + {7, 8} cannot be combined. ⓘ

⋯ **Solve**: Equations may not give solutions for all "solve" variables. ⓘ

Exercises

1. Do Problems 1-2 above.

2. Let A be the matrix: {{0,0,2,2,4},{0,1,2,4,8},{1,2,1,2,1},{1,2,4,5,7}}

In[ ]:=
```
A={{0,0,2,2,4},{0,1,2,4,8},{1,2,1,2,1},{1,2,4,5,7}}
u={0,0,0,0}
v={1,1,1,1}
```

Out[ ]=
```
{{0, 0, 2, 2, 4}, {0, 1, 2, 4, 8}, {1, 2, 1, 2, 1}, {1, 2, 4, 5, 7}}
```

Out[ ]=
```
{0, 0, 0, 0}
```

Out[ ]=
```
{1, 1, 1, 1}
```

    2.1. Input the matrix and name it A.

    2.2. Input the vectors u=[0,0,0,0] and v=[1,1,1,1].

    2.3. Append vector u to A as a column vector and call the new matrix Au. Do the same for v, calling the appended matrix Av.

```
In[ ]:=  Au = Transpose[Append[Transpose[A], u]]
         Av = Transpose[Append[Transpose[A], v]]
         MatrixForm[RowReduce[Au]]
         MatrixForm[RowReduce[Av]]
```

Out[ ]=

$\{\{0, 0, 2, 2, 4, 0\}, \{0, 1, 2, 4, 8, 0\}, \{1, 2, 1, 2, 1, 0\}, \{1, 2, 4, 5, 7, 0\}\}$

Out[ ]=

$\{\{0, 0, 2, 2, 4, 1\}, \{0, 1, 2, 4, 8, 1\}, \{1, 2, 1, 2, 1, 1\}, \{1, 2, 4, 5, 7, 1\}\}$

Out[ ]//MatrixForm=

$$\begin{pmatrix} 1 & 0 & 0 & -3 & -9 & 0 \\ 0 & 1 & 0 & 2 & 4 & 0 \\ 0 & 0 & 1 & 1 & 2 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

Out[ ]//MatrixForm=

$$\begin{pmatrix} 1 & 0 & 0 & -3 & -9 & 0 \\ 0 & 1 & 0 & 2 & 4 & 0 \\ 0 & 0 & 1 & 1 & 2 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

2.4. Use RowReduce to RREF the matrices Au and Av.

2.5. Describe the solution sets to the augmented systems [A|u] and [A|v] algebraically.

The augmented system [A|u] has two free variables, x4 and x5. The only solution is the trivial solution, meaning that this system is linearly independent.

The augmented system [A|v] also has x4 and x5 as free variables. Because the bottom row shows 0=1, the system is inconsistent and cannot be solved.

3. Use File-Save As… to save your file as a **pdf,** then upload just the solutions to the exercises above to Moodle.