

DASC 2594 – Multivariable Math for Data Scientists
Assessment 1
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Problem 1

Using R , let $\mathbf{A} = \begin{pmatrix} 3 & 7 \\ 4 & 2 \end{pmatrix}$.

- a) Swap the rows of \mathbf{A} and save as \mathbf{B} .
- b) Swap the columns of \mathbf{A} and save as \mathbf{C} .

Problem 2

Using R , let $\mathbf{A} = \begin{pmatrix} 4 & 2 & 5 \\ 7 & 3 & 6 \end{pmatrix}$. Swap the second and third columns and save as \mathbf{D}

Problem 3

Reduce the matrix $\mathbf{A} = \begin{pmatrix} 4 & 3 & 7 \\ 2 & 6 & 1 \\ 4 & 3 & 8 \end{pmatrix}$ to reduced row echelon form

- a) by hand. You can include an image of your hand-written work using

```
include_graphics(here::here("path", "to", "file"))
```

- where
 - 1) your Rmd file is in your project directory
 - 2) your Rstudio project is loaded
 - 3) your image of your hand-written work is in the filepath “./path/to/file” (macOS) or “tofile” (windows) where the relative home directory is your project
- b) “by hand” in R using row and column permutations
- c) “by hand” in R using permutation matrices
- d) In R using the `rref` function

Problem 4

Solve the system of linear equations

$$3x + 5y + 2z = 5$$

$$4x - 7y + 6z = -3$$

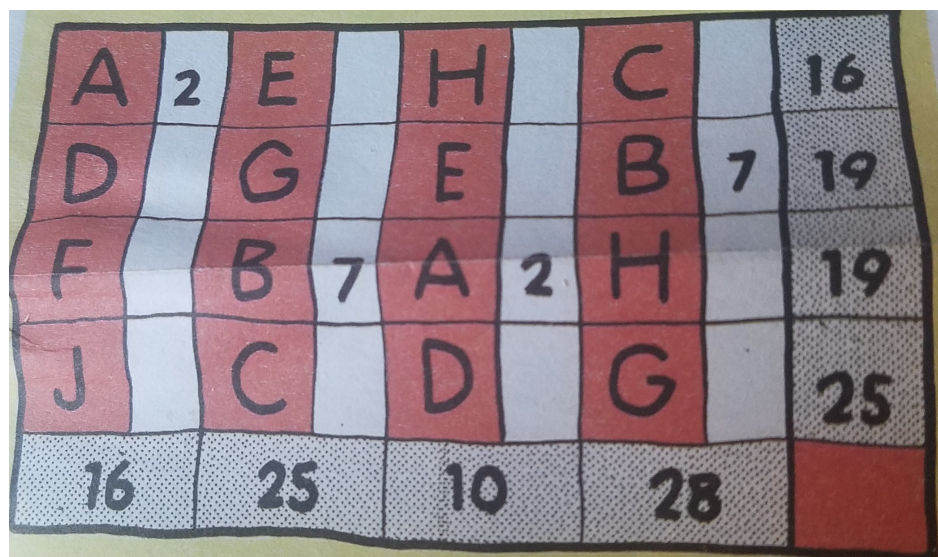
$$7x + 2y - 3z = 4$$

- a) by hand using an augmented matrix and RREF
- b) in R using an augmented matrix and RREF

Problem 5

Solve this puzzle using systems of linear equations

```
knitr::include_graphics(here::here("images", "puzzle.jpg"))
```



Problem 6

Identify if the following systems of equations have a unique solution

a)

$$x + 2y = 4$$

$$2x + 4y = 8$$

b)

$$x + 2y = 4$$

$$3x - 2y = 8$$

Problem 7

Are the equations in 6a and 6b linearly dependent or independent?