

# Finite Mathematics

## Homework 3

Due in class Monday, March 2, 2020

*Note:* Assignments marked (\*) are *not* for bonus credit. They will not be graded. Do not turn them in. However, they will be discussed in the tutorial and typically example solutions are available online (in case of Hefferon's book, there is a PDF with solutions available on the book's web site.)

1. \*Demonstrate that

$$\mathbf{A} = \begin{pmatrix} 2 & 2 & 3 \\ 1 & 0 & 1 \\ 1 & 1 & 1 \end{pmatrix} \quad \text{and} \quad \mathbf{B} = \begin{pmatrix} -1 & 1 & 2 \\ 0 & -1 & 1 \\ 1 & 0 & -2 \end{pmatrix}$$

are both nonsingular by showing that  $\mathbf{AB} = \mathbf{I}$ .

2. \*Give an example that shows, in general,  $\mathbf{AB} \neq \mathbf{BA}$ .
3. Show that if  $\mathbf{A}$  is symmetric and nonsingular, then  $\mathbf{A}^{-1}$  is symmetric. (2)
4. \*Hefferon, p. 252, Exercises 4.15
5. Compute the inverse, if possible, of each of the following matrices.

(a)  $\mathbf{A} = \begin{pmatrix} 1 & 4 \\ -2 & 3 \end{pmatrix}$

(b)  $\mathbf{A} = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{pmatrix}$

(c)  $\mathbf{A} = \begin{pmatrix} 1 & 2 & 1 \\ -2 & 1 & 8 \\ 1 & -2 & -7 \end{pmatrix}$

(2+2+2)

6. VMLS, p. 218, Exercise 11.9. (2)