**Your Name:** Cole Bardin **Section: 62**

*first last*

**Lab 2: Matrix Explorations Spring 2022**

As a convenience, this **answer template** is provided if you wish to easily submit your work. Be sure to save it as a PDF before submitting online! Only one submission is allowed.

**Question 1: Solve a Linear System by Row Reducing the Augmented Matrix**

The unique solution is:

( ***x = 6, y = 6, z = 6*** )

**Question 2: Solve a Linear System with a Free Variable**

**1 1 0 2**

**0 0 1 1**

**0 0 0 0**

**a.** Record the RAM from part **a** here. 🡪

**b.** The solution is:

( ***x = 2 – y, y = y(free), z = 1*** )

**Question 3: Matrices in general do not commute.**

**Question 3a.** Find the matrix below that commutes with *A*. Circle or highlight it.

**i.** **ii.** **iii.**

**Question 3b.** For to commute with , the matrix B must have the form:

**i.**  **ii.**  **iii.** **iv.**

**Question 3c.** For *B* to commute with the new matrix , *B* must have the form:

**i.**  **ii.**  **iii.** **iv.**

**Question 4: Commuting Pairs of Matrices**

**Question 4:** The number of commuting pairs is: **1**

**Question 5: Trace of a matrix product *AB***

**Question 5a:** The trace of A = magic(3) is: **15**

**Question 5b:** The number of pairs satisfying is: **All: 1,000**

**Question 5c:** The number of pairs satisfying is: **Varies, Usually around 210-ish**

**Question 6: Determinant of a matrix product *AB*. Preview of Determinant**

**Question 6:** The number of matrix pairs satisfying is: **All: 10,000**

**Question 7: Row Equivalent Matrices and the Reducing Matrix R**

**Question 7a.** The matrix row-equivalent to *A* is: **B**

**Question 7b.** Record your value for R here:

**Question 8: Solving Linear Systems using linsolve(A, b)**

**Question 8a.** Record the solution here:

**Question 8b.** Record the RAM here.

A picture containing chart

Description automatically generated

**Questions 9-10: A Stoichiometry Example/Combustion of Propane**

**1 0 0 5**

**0 1 0 4**

**0 0 1 3**

**a.** Record the RAM here.

**b.** Balance the equation. Fill in a positive integer inside each box.

**3**

**4**

**5**

**Ready to Submit?**

Be sure all ten questions are answered. When your lab is complete, be sure to submit four files:

1. Your **completed Answer Template** as a PDF file
2. A copy of your **original MALAB Script**
3. A copy of your **MATLAB Live Script**
4. A **PDF** copy of your **MATLAB Live Script** (Save-Export to PDF…)

The due date is the day after your lab section by **11:59pm** to receive full credit. You have one more day, to submit the lab (but with a small penalty), and then the window closes, and your grade will be zero.