LARSON—MATH 310—SAGE WORKSHEET 02
Matrices.

1. Log in to your Sage Cloud account.
   (a) Start Chrome browser.
   (b) Go to http://cloud.sagemath.com
   (c) Click “Sign In”.
   (d) Click project Math 310.
   (e) Click “New”, call it s02, then click “Sage Worksheet”.

2. We can represent the system of linear equations
   \[
   \begin{align*}
   2x + y &= 5 \\
   x + 3y &= 7
   \end{align*}
   \]
   with the matrix \( A = \begin{bmatrix} 2 & 1 & 5 \\ 1 & 3 & 7 \end{bmatrix} \)
   Enter this in Sage by evaluating: \( A = \text{matrix}(2, 3, [2, 1, 5, 1, 3, 7]) \)

3. Evaluate \( A \) to see your matrix.

4. Evaluate \( A.rref() \) to find a matrix that represents an equivalent system in row-reduced echelon form. What do you get?

5. Consider the system:
   \[
   \begin{align*}
   x + 3y &= 5 \\
   x + 3y &= 7
   \end{align*}
   \]
   Find a matrix that represents this system, and enter it in Sage. Then use Sage to find the row-reduced echelon form of this matrix. Then rewrite (on your own, without Sage) this as an equivalent system of linear equations and interpret.
6. Consider the system:\[
\begin{align*}
    x + y &= 5 \\
    2x + 2y &= 10
\end{align*}
\] 
Find a matrix that represents this system, and enter it in Sage. Then use Sage to find the row-reduced echelon form of this matrix. Then rewrite (on your own, without Sage) this as an equivalent system of linear equations and interpret.

7. Consider the system:\[
\begin{align*}
    9a + 3b + 1c &= 32 \\
    4a + 2b + 1c &= 15 \\
    1a + 1b + 1c &= 6
\end{align*}
\] 
Find a matrix that represents this system, and enter it in Sage. Then use Sage to find the row-reduced echelon form of this matrix. Then rewrite (on your own, without Sage) this as an equivalent system of linear equations and interpret.

8. Evaluate $A=\text{matrix}(2,2,[1,2,3,4])$, and $b=\text{vector}([5,6])$. Solve the matrix equation $A\hat{x} = \hat{b}$ by evaluating $A.\text{solve_right}(b)$. What do you get?