MATH 3350
R Quiz 4

Instructions

- This is a take-home exam. You may use your own resources, course resources, or those found online. However, you may not interact with any other people or AI about the exam. (You should be generating your own answers.)

- You should upload the R file containing your code and the R output (as comments) with your answers. Include commented question numbers to separate your answers but otherwise you don't need to document your code. The code should be totally self-contained, so include in the code any functions that you use.

- There is typically **no partial credit**, so carefully check your work before submission. (This includes syntax for any R code that you are asked to provide.)

1. Use Cramer's Rule to find the value of x_3 in the solution to the linear system

$$
\begin{aligned}
5x_1 - 11x_2 - 23x_3 + x_4 &= 0 \\
x_1 + 8x_2 - 19x_3 - 5x_4 &= 7 \\
-14x_1 + 6x_2 + 7x_3 + 2x_4 &= 16 \\
3x_1 - 9x_2 - 4x_3 + 6x_4 &= 6
\end{aligned}
$$

2. Let

$$
B = \begin{bmatrix}
-92 & -157 & 488 & 1723 \\
-404 & -659 & 2080 & 7372 \\
-507 & -827 & 2609 & 9245 \\
102 & 166 & -524 & -1857
\end{bmatrix}
$$

   (a) Find P and D in the diagonalization of B.

   (b) Use the Power Method to find an approximation for the dominant eigenvalue and corresponding eigenvector for B. (Use 20 iterations.)