In this assignment, the question provides a given matrix A and the right hand side term b that need to be coded, and asks to solve the system of the linear equations using Crout factorization algorithm (from https://en.wikipedia.org/wiki/Crout_matrix_decomposition). Then the question requires to investigate the behavior of the solution when n approaches to infinity.

A graph of x when n takes different values
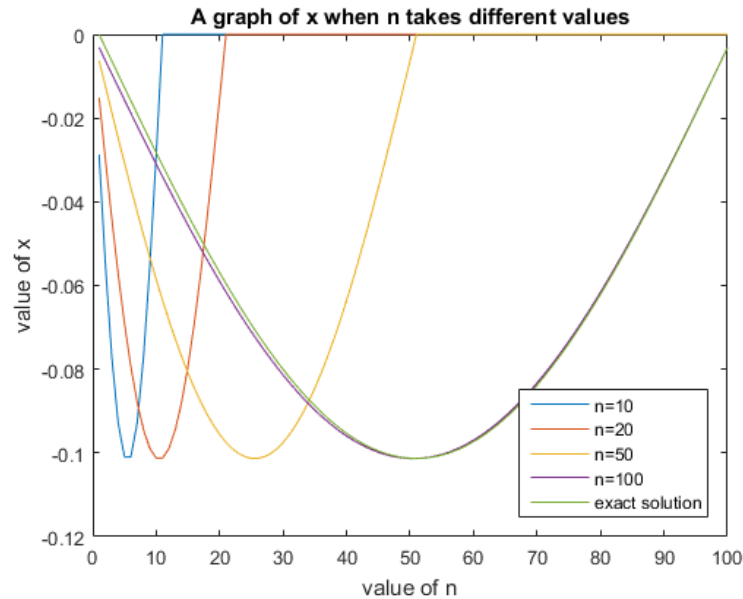
First, I code up the given matrix A. Then, I use Crout factorization algorithm from Wiki to decompose the given matrix A to an upper and a lower triangular matrix L and U. Then, solve for x. (x = inv(U) * inv(L) *b).

I use wolfram alpha to solve the differential equation in NOTE 2 and the solution is - **sin(pi*x)/ (pi^2).** Then, from the resulting graph, I find when n increases, the graph looks like a symmetric curve locates in the 4th quadrant. Also, when n approaches to infinity, the graph of x satisfies the expectation as shown in the graph.