1. Write a R-code called GEwithoutpivot that will take as input a square matrix A, a vector b and perform Guassian elimination without any pivoting. It should return: the reduced augemented matrix

2. Write a R-code called GEwabspivot that will take as input a square matrix A, a vector b and perform Guassian elimination with partial pivoting with method 1 (as described in notes, page 9). It should return: the reduced augemented matrix

3. Write a R-code called GEwscapivot that will take as input a square matrix A, a vector b and perform Guassian elimination with partial pivoting with method 2 (as described in notes, page 10). You may also use the next class notes where we did an example. It should return: the reduced augemented matrix

4. Centrifugal pumps are common devices used to move liquid through piping systems. The key question is to determine the pressure head h of the pump given q the flow rate. The model used is the following:

$$h = c_1 q^2 + c_2 q + c_3$$

Consider q and h from the following table:

q(m^3/s)	0.0001	0.00025	0.0008	0.001	0.0014
h(m)	115	114.2	110	105.5	92.5

Assuming the model is correct,

   (a) Use each of the codes that you have written above and obtain the augmented matrix.

   (b) With each ouput write an R-code called backsub to solve for c_1, c_2, c_3.

   (c) Use the inbuilt function solve command in R to solve the above.