

NAME :

Write all commands in Sage to use numpy to do the following.

Define a tridiagonal 5-by-5 numpy matrix **A**: 3 on the diagonal and 1 just below and 1 just above the diagonal. Do **NOT** type in the 25 elements of **A**. Printing **A** shows:

```
[[3 1 0 0 0]
 [1 3 1 0 0]
 [0 1 3 1 0]
 [0 0 1 3 1]
 [0 0 0 1 3]]
```

Take as right hand side **b** a vector of all ones. Use numpy to solve the system $\mathbf{A} \cdot \mathbf{x} = \mathbf{b}$ and write the norm of the residual $\mathbf{b} - \mathbf{A} \cdot \mathbf{x}$.