

MATH 240 QUIZ 7

Name: \_\_\_\_\_

**Question:**

Find all eigenvalues of the matrix

$$A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & 1 & 0 \end{bmatrix}.$$

**Solution:**

Eigenvalues are roots of the characteristic polynomial  $p(\lambda) = \det(A - \lambda I)$ .

Since we have

$$\begin{aligned} \det(A - \lambda I) &= \det \begin{bmatrix} 2 - \lambda & 0 & 0 \\ 0 & -\lambda & -1 \\ 0 & 1 & \lambda \end{bmatrix} \\ &= (2 - \lambda)(\lambda^2 + 1) \end{aligned}$$

therefore eigenvalues are  $2, i, -i$ .