

Name:

1. Write the word “true” or “false”: Let A be a 3×3 matrix with real entries and complex eigenvalue $\alpha + \beta i$ (that is, α is a real number and β is a nonzero real number). Then A has three distinct eigenvalues.

2. (a) Solve the following initial value problem:

$$\mathbf{x}' = \begin{pmatrix} 2 & 4 \\ 4 & 2 \end{pmatrix} \mathbf{x}$$
$$\mathbf{x}(0) = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

- (b) What type of system is the above differential equation? Circle one.
- i. source
 - ii. sink
 - iii. saddle point
 - iv. spiral in
 - v. spiral out
 - vi. periodic