

MATH 331.1, Fall 2007 : Quiz #3

Your Name: _____

The quiz has 1 question worth 10 points.

1. Consider the linear system $\frac{d\mathbf{Y}}{dt} = A\mathbf{Y}$ where $A = \begin{pmatrix} 1 & 3 \\ 1 & -1 \end{pmatrix}$.

(a) (5 points) Compute the eigenvalues and eigenvectors of the matrix A

$$\lambda_1 = \quad \mathbf{v}_1 = \begin{pmatrix} \quad \\ \quad \end{pmatrix} \quad \lambda_2 = \quad \mathbf{v}_2 = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$$

(b) (4 points) Solve the initial value problem $\frac{d\mathbf{Y}}{dt} = A\mathbf{Y}$ with $\mathbf{Y}(0) = \begin{pmatrix} 0 \\ 3 \end{pmatrix}$.

$$\mathbf{Y}(t) = \begin{pmatrix} x(t) \\ y(t) \end{pmatrix} =$$

(c) (1 points) Sketch the $x(t)$ and $y(t)$ graphs for the solution to the initial value problem in (b).