

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

Date: \_\_\_\_\_

MA 226 Quiz 8 – A

**Please show your work.**

1. (5 pts) Solve the initial value problem  $\frac{d\vec{Y}}{dt} = \begin{pmatrix} -2 & -2 \\ -2 & 1 \end{pmatrix} \vec{Y}$  with  $\vec{Y}(0) = \begin{pmatrix} 0 \\ -10 \end{pmatrix}$

- a.) Find the eigenvalues
- b.) Find the corresponding eigenvectors
- c.) Find the solution of the initial value problem.

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2. (5 pts) The linear system:  $\frac{d\vec{Y}}{dt} = A\vec{Y}$  where matrix has a general solution given by  $\vec{Y}(t) = k_1 e^{-t} \begin{pmatrix} 1 \\ 1 \end{pmatrix} + k_2 e^{-4t} \begin{pmatrix} -1 \\ 2 \end{pmatrix}$ . Make a sketch of the phase portrait for this system.

