Name: SLA Date: 3/22/2018

M20580 L.A. and D.E. Tutorial
Quiz 6

1. Suppose 0 is an eigenvalue of the matrix A. Which of the following statements MUST be true? (Circle ALL that apply)

   1. A is invertible.
   2. The determinant of A is zero.
   3. The columns of A are linearly dependent.
   4. There are an infinite number of solutions to the system $Ax = 0$.
   5. The trace of A is 0.

2. The matrix $A = \begin{bmatrix} 3 & -2 \\ 1 & 1 \end{bmatrix}$ Find a COMPLEX Eigenvector of A.

$$(3-\lambda)(1-\lambda) + 2 = 0$$

$$3 - 4\lambda + \lambda^2 + 2 = 0$$

$$\lambda^2 - 4\lambda + 5 = 0$$

$$\lambda = \frac{4 \pm \sqrt{16 - 4(5)}}{2} = \frac{4 \pm \sqrt{-4}}{2}$$

$$= 2 \pm i$$

There are many Answers to this

$[A - (2+i)I]$

$$\begin{bmatrix} 1-i & -2 \\ 1 & -1-i \end{bmatrix}$$

$$(1-i)x_1 = 2x_2$$

$$x_1 = (1+i)x_2$$

Thus let $x_2 = 1$

$$x_1 = (1+i)$$

$$\begin{bmatrix} 1+i \\ 1 \end{bmatrix}$$