

Math 3160 - Quiz 6

Name: _____

1. Diagonalize the following matrices if possible. If not possible state why.

$$A = \begin{bmatrix} 1 & 3 \\ 1 & -1 \end{bmatrix}, B = \begin{bmatrix} 6 & 3 & -8 \\ 0 & -2 & 0 \\ 1 & 0 & -3 \end{bmatrix} \text{ and}$$

$$C = \begin{bmatrix} 4 & 0 & -1 \\ 0 & 3 & 0 \\ 1 & 0 & 2 \end{bmatrix}$$

1 Recursively Defined Sequences

2. Let a sequence be defined by the following recursive formula

$$a_1 = 3, a_2 = 0 \text{ and } a_{n+2} = 3a_{n+1} - 2a_n$$

- (a) Compute the first five terms of the sequence.
- (b) Find a matrix A for the sequence as we did in class.
- (c) Diagonalize A . That is find D and P so that $A = PDP^{-1}$.
- (d) Compute $A^n \begin{bmatrix} 0 \\ 3 \end{bmatrix}$ using Problem 2c.

3. Let a sequence be defined by the following recursive formula

$$a_1 = 4, a_2 = 1 \text{ and } a_{n+2} = a_{n+1} + 6a_n$$

- (a) Compute the first five terms of the sequence.
- (b) Find a matrix A for the sequence as we did in class.
- (c) Diagonalize A . That is find D and P so that $A = PDP^{-1}$.
- (d) Compute $A^n \begin{bmatrix} 4 \\ 1 \end{bmatrix}$ using Problem 3c.