

# Math 33A — Week 10

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

1. Find the eigenvalues and eigenvectors of the following matrices:

(a)  $A = \begin{pmatrix} 1 & 2 \\ 2 & 4 \end{pmatrix}$

(b)  $B = \begin{pmatrix} 6 & -2 \\ -2 & 3 \end{pmatrix}$

(c)  $C = \begin{pmatrix} 2 & -1 & -1 \\ -1 & 2 & -1 \\ -1 & -1 & 2 \end{pmatrix}$

2. The matrices in the previous example are symmetric. For each of the matrices in the previous example, perform Gram-Schmidt on the eigenvectors to find a set of orthonormal eigenvectors. Then write  $A = QDQ^T$  where  $Q$  is the matrix of orthonormal eigenvectors,  $D$  is the diagonal matrix of eigenvalues.