

## MATH 54 – SOLUTION TO 5.3.21

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- (a) **FALSE** ( $D$  has to be **diagonal!**)
- (b) **TRUE** (Theorem 5; Let  $D$  be the matrix of eigenvalues, and  $P$  be the matrix of corresponding eigenvectors)
- (c) **FALSE** (Notice that we didn't say *distinct* eigenvalues. It is true that if  $A$  is diagonalizable, then by Theorem 7b,  $A$  has  $n$  eigenvalues *including multiplicities*; but for example the matrix  $A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$  has eigenvalue 1 with multiplicity 2 (so 2 eigenvalues counting multiplicity) but  $A$  is not diagonalizable)
- (d) **FALSE** (Take  $A$  to be the  $O$  matrix. Then  $A$  is not invertible, but  $A$  is diagonalizable because it's diagonal)