

## Eigenspaces

1. If a vector  $x$  is in the eigenspace of  $A$  corresponding to  $\lambda$ , and  $\lambda \neq 0$ , then  $x$  is
  - (a) in the nullspace of the matrix  $A$ .
  - (b) in the nullspace of the matrix  $A - \lambda I$ .
  - (c) not the zero vector.
  - (d) More than one of the above correctly completes the sentence.
  
2. Which of the following statements is correct?
  - (a) The set of eigenvectors of a matrix  $A$  forms the eigenspace of  $A$ .
  - (b) The set of eigenvectors of a matrix  $A$  spans the eigenspace of  $A$ .
  - (c) Since any multiple of an eigenvector is also an eigenvector, the eigenspace always has infinite dimension.
  - (d) More than one of the above statements are correct.
  - (e) None of the above statements are correct.
  
3. Which of the following statements is correct?
  - (a) The set of eigenvectors of a matrix  $A$  corresponding to a particular eigenvalue  $\lambda_1$ , together with the zero vector, forms the eigenspace of  $A$  corresponding to  $\lambda_1$ .
  - (b) An eigenspace corresponding to a non-repeated eigenvalue has dimension one.
  - (c) An eigenvalue of multiplicity two has a corresponding eigenspace of dimension two.
  - (d) All of the above statements are correct.
  - (e) Exactly two of the above statements are correct.