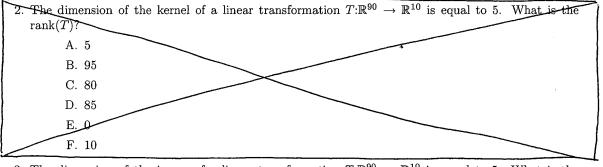
Name:

Show all work clearly and in order. Please box your answers. 10 minutes.

- 1. What is the dimension of a vector space?
  - A. The number of possible bases for the vector space.
  - B. The set of all vectors in the vector space.
  - C. The number of vectors in the vector space.
  - D. The span of all the vectors in the vector space.
  - E. The number of vectors in the span of any set of vectors in the vector space.
  - F. The number of vectors in a basis of the vector space.
  - G. None of the above.



This is not possible since the rank (T) Cannot be greater than 10.

- 3. The dimension of the image of a linear transformation  $T:\mathbb{R}^{90}\to\mathbb{R}^{10}$  is equal to 5. What is the dimension of the kernel of T? dim (im (T)) + dim (kar(T)) = dim (Domain (T))
  - A. 5
  - B. 95
  - C. 80
  - D. 85 E. 0

F. 10

So

dim(ke-(T)) = 90 - 5 = 85

- 4. Let B be a  $n \times n$  matrix. Suppose x is in the null space of B then
  - A.  $B\mathbf{x} = \mathbf{0}$
  - B. x must be the zero vector
  - C.  $B\mathbf{x} = \mathbf{y}$  where  $\mathbf{y} \neq 0$
  - D. None of the above.
- 5. Suppose that A and B are  $n \times n$  matrices. Show that if x is in the null space of B then x is in the null space of AB.

$$\overrightarrow{X}$$
 is in the nullspace of  $B \implies B\overrightarrow{X} = \overrightarrow{O}$ 

notice

$$(AB)\overrightarrow{x} = A(B\overrightarrow{x}) = A\overrightarrow{o} = \overrightarrow{o}$$