**3B**

**5.solution: assume that (e1,e2,e3,e4) is a basis of R4, we define T∈L(R4,R4) that: Te1=Te2=0,Te3=e1,Te4=e2.note that nullT=rangeT=span(e1,e2), hense the nullT=rangeT.**

**6.see the solution**

**10.conclusion: suppose (v1,...,vn) spans V and T∈L(V,W), prove that (Tv1,...,Tvn)spans rangeT.**

**Similar conclusion: suppose (v1,...,vn) spans V and T∈L(V,W) is surjective, prove that (Tv1,...,Tvn)spans W.**

**point: prove that rangeT⊂span(Tv1,...,Tvn) and rangeT⊃span(Tv1,...,Tvn)**

**12.solution: there exsists a subspace U of V that V = U⊕nullT. From the defination of direct sum we have U∩nullT={0}.**