## WRITE YOUR NAME HERE:

## ALGEBRA - FINAL EXAM

Write your final solutions on this sheet. Use another sheet for preliminary work. Do not talk, cheat or else...!

- 1. Let  $F:V \rightarrow W$  and  $G:W \rightarrow T$  be linear mappings. Prove that  $G \circ F$  is a linear mapping and ker(F)  $\subseteq$  ker( $G \circ F$ ).
- 2. Let F(x,y,z,t)=(-x-y-2z+t,2x+y+3z-t,2x+4z-t,2x-2y+5z). Find a Jordan block matrix J for F.
- 3. For the operator F from previous problem, find a basis for  $\mathbf{R}^4$  such that  $M_R(F)=J$ .
- 4. Prove directly from definition, that for every linear mapping F, ker(F)= $\{\theta\}$  if and only if F is one-to-one.
- 5. Solve in complex numbers the equation  $z^4 = (3i-2)^4$ .