Math 550 QUIZ #2 Name:.....ID:.....

1) If f is a projection on A parallel to B, prove that $I_V - f$ is the projection on B parallel to A.

2) Consider the mapping $f : \mathbb{R}^3 \to \mathbb{R}^3$ given by,

$$f(x, y, z) = (2x + y - z, -2x - y + 3z, z)$$

a) Find the minimum polynomial of f.
b) Deduce that

$$\mathbb{R}^3 = \text{Ker } f \ \oplus \ \text{Ker}(f - Id)^2$$

c) Find a basis B of $\mathbb{R}^3$ with respect to which the matrix of f is in a block diagonal form.
d) Find the block diagonal matrix that represents f relative to the basis B.