Lecture 6 Problems

Problem 1

(a): We see that since, for some vectors ~~v and w that~~ v and v* in S and some vectors w and w* in T, that

$(v + w) + (v^* + w^*) = (v + v^*) + (w + w^*)$ and

$c(v + w) = cv + cw$, thus the subspace S+T is closed under these two operations.

(b): S+T is made up of all linear combinations of the two lines, while S ∩ T is just the line; S+T is a plane.

Problem 2

We see that

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 12 \\ 0 \\ 0 \end{bmatrix} + y \begin{bmatrix} 3 \\ 1 \\ 0 \end{bmatrix} + z \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$$

Problem 3

We see that

$$N(C) = N(A) \cap N(B)$$