(a) $c_1, c_2, \dots c_k$ is linearly independent.

proof:

if $c_1, c_2, \dots c_k$ is linearly dependent.

then there are not all zero scalars $d_1, d_2 \dots d_k$, such that

$d_1 c_1 + d_2 c_2 + \dots + d_k c_k = 0$

$\Rightarrow d_1 a_1 + d_1 a_2 + \dots + d_k a_k = 0 \Rightarrow$ contradiction to $a_1, a_2 \dots a_k$ is linearly independant.

(b) It does not follow $c_1, c_2, \dots c_k$ is linearly dependent.

proof if $c_1, c_2, \dots c_k$ is linearly dependent

$\Rightarrow$ there are not all zeros scalar $d_1, d_2 \dots d_k$, such thet

$d_1 c_1 + d_2 c_2 + \dots + d_k c_k = 0$

$\Rightarrow d_1 b_1 + d_2 b_2 + \dots + d_k b_k = 0$

$\Rightarrow b_1, b_2, \dots b_k$ are linearly dependent

which is contradiction to no assumption of $b_1, b_2, \dots b_k$.