A) G is connected

B) G is acyclic

a tree

C) $|V| = |E|+1$

any two of A, B, C imply the other

$B + C \Rightarrow A$

Let $G = (V,E)$ be an acyclic graph with $|V|=|E|+1$.

Let $G_1, G_2, \ldots G_k$ be the connected components of G. Each graph G_i must be a tree since it is connected and acyclic.

So (because we already proved $A) + B) \Rightarrow C)$)

$$|V| = |V(G_1)| + |V(G_2)| + \ldots + |V(G_k)|$$

$$= (|E(G_1)|+1) + (|E(G_2)|+1) + \ldots (|E(G_k)|+1)$$

$$= |E(G)| + k.$$

Thus $k=1$ and A) holds.