(a) Essentially we use $A$ to generate $\{0^n1^n \mid n \geq 0\}$ and $B$ to generate $\{1^k \mid k > 0\}$, a nonempty string of 1s.

$S \rightarrow AB$
$A \rightarrow 0A1|\epsilon$
$B \rightarrow 1B|1$

(b) Assume that $w \in L$. Then $w = 0^n1^n \epsilon$, $k > 0, n \geq 0$. We will prove that $S \Rightarrow AB \Rightarrow w$ by induction on $n$ ($A \Rightarrow 0^n1^n$) and then induction on $k$ ($B \Rightarrow 0^k$).

If $n=0$, then $A \Rightarrow \epsilon$ and we are done. Assuming $A \Rightarrow 0^n1^n$, then production $A \rightarrow 0A1$ yields $A \Rightarrow 0A1 \Rightarrow 0011 = 0^{n+1}1^{n+1}$, so $A$ derives arbitrarily long, nonempty strings of the form $0^n1^n$.

If $k=1$, then $B \Rightarrow 1$ and we are done. Assuming $B \Rightarrow 1^k$, then production $B \rightarrow 1B$ yields $B \Rightarrow 1B \Rightarrow 11^k = 1^{k+1}$, so $B$ derives arbitrarily long, nonempty strings of 1s. Thus $L(G) \subseteq L$.

Assume that $w \in L(G)$. Consider a rightmost derivation of $w$. All derivations in $G$ start with $S \Rightarrow AB$. If there are 0 applications of production $B \rightarrow 1B$, then $S \Rightarrow AB \Rightarrow \epsilon$.

(c) Assume $L$ is regular. Then let $n$ be the constant specified by the Pumping Lemma for Regular Languages, and let $w = 0^n1^n \epsilon \in L$. Then $w$ can be written $w = xyz$ where $|xy| \leq n$ ($xy$ spans only 0s) and $y \neq \epsilon$, so $y$ must be a nonempty string of 0s. It follows that $xy^3z \in L$, although $xy^3z$ has more 0s than 1s. This contradiction shows that our assumption that $L$ is regular must be false.