Show that $\gcd(n!+1, (n+1)!+1) = 1$

Solution: Using GCDWR, we see that since

$$(n+1)!+1 = (n+1)(n!+1) - n$$

then $\gcd(n!+1, (n+1)!+1) = \gcd(n!+1, -n)$. Let $d = \gcd(n!+1, -n)$. Then $d \mid (n!+1)$ and $d \mid (-n)$ hence $d \mid n$. This implies that $d \mid (n!)$. Thus, Divisibility of Integer Combinations gives us that, $d \mid (n!+1) - n! = 1$. Hence $d = 1$. Thus, $\gcd(n!+1, (n+1)!+1) = d = 1$.