Let $p$ be a prime, $n$ be a positive integer, $q = p^n$ and $\mathbb{F}_q$ be the field of $q$ elements. The smallest $s$ such that $x_1^k + x_2^k + \cdots + x_s^k = \alpha$ has a solution for all $\alpha \in \mathbb{F}_q$ is called Waring’s number, denoted $\gamma(k, p)$. I improve a bound on $\gamma(k, p)$ established by Winterhoff to the following: if $\gamma(k, p^n)$ exists then for $p^{\frac{n}{2}} < k < (p^n - 1)/2$ we have $\gamma(k, p^n) < \frac{6.2n(2k)^{1/n} \ln(k)}{(\frac{p^n-1}{k}, p-1)}$. For the case when $k < p^{\frac{n}{2}}$, an extension of a result by Glibichuk gives $\gamma(k, p) \leq 8$. I also establish lower bounds for special cases in $\mathbb{F}_p$, namely for $t = \frac{p-1}{k}$ prime and $n \leq \phi(t)$, $\gamma(k, p) > (\frac{n+p}{n+1})^\frac{1}{t} - n$. (Received September 15, 2007)