**Question**
Show that if $f(x) \sim g(x)$ as $x \to \infty$, then $f(x) = \{1 + o(1)\}g(X)$ as $x \to \infty$.

**Answer**
$\lim_{x\to\infty} \dfrac{f(x)}{g(x)} = 1 \Leftrightarrow f \sim g,\ x \to \infty$

Thus $\lim\limits_{x\to\infty} \left( \dfrac{f(x)}{g(x)} - 1 \right) = 0$

$\Rightarrow \dfrac{f(x)}{g(x)} - 1 = o(1) \Rightarrow \underline{f(x) = [1 + o(1)]g(x)}$