Theorem (3.2.4)**.** *Let f be the function defined by $f(x) = 2^x + 17$. $f(x)$ is $\mathcal{O}(3^x)$.*

Proof. Let g be the function defined by $g(x) = 3^x$. $17 < 3^3$, and clearly $2^x \leq 3^x$, for all $x \geq 3$. So $2^x + 17 \leq 3^x + 3^x$, for all $x > 3$. It follows from the definitions of f and g that $|f(x)| \leq 2|g(x)|$, for all $x > 3$. Therefore, by definition, $f(x)$ is $\mathcal{O}(3^x)$ with constant witnesses $C = 2$, and $k = 3$. ■