Summarized from:

http://www.cs.odu.edu/~toida/nerzic/content/function/growth.html

Algebraic:

$f(x)$ is Big-O of $g(x)$ if $\exists C, n_0$ s.t. $|f(x)| < C|g(x)|$ when $x > n_0$

This can be written simply as $f(x) \in O(g(x))$ once it is shown to be true.

$f(x)$ is Big-Omega of $g(x)$ if $\exists C, n_0$ s.t. $|f(x)| > C|g(x)|$ when $x > n_0$

This can be written simply as $f(x) \in \Omega(g(x))$ once it is shown to be true.

$f(x)$ is Big-Theta of $g(x)$ if both $f(x) \in O(g(x))$ and $f(x) \in \Omega(g(x))$.

This can be written simply as $f(x) \in \Theta(g(x))$ once it is shown to be true. We may also say that $f(x)$ is of order $g(x)$.

$f(x)$ is little-o of $g(x)$ if $f(x) \in O(g(x))$ but $f(x) \notin \Theta(g(x))$.

This can be written simply as $f(x) \in o(g(x))$ once it is shown to be true.

$f(x)$ is little-omega of $g(x)$ if $f(x) \in \Omega(g(x))$ but $f(x) \notin \Theta(g(x))$.

This can be written simply as $f(x) \in w(g(x))$ once it is shown to be true.

By Limits:

$$f(x) \in o(g(x)) \text{ if } \lim_{x \to \infty} \frac{f(x)}{g(x)} = 0$$

$$f(x) \in o(g(x)) \text{ if } \lim_{x \to \infty} \frac{f(x)}{g(x)} = \infty$$

$$f(x) \in \Theta(g(x)) \text{ if } 0 < \lim_{x \to \infty} \frac{f(x)}{g(x)} < \infty$$

$$f(x) \in O(g(x)) \text{ if } \lim_{x \to \infty} \frac{f(x)}{g(x)} < \infty$$

When both $f(x)$ and $g(x)$ go to ∞ as x goes to ∞ or both $f(x)$ and $g(x)$ go to 0 as x goes to ∞, this limit is difficult to evaluate. Dead French guy L'Hopital to the rescue:

$$\lim_{x \to \infty} \frac{f(x)}{g(x)} = \lim_{x \to \infty} \frac{f'(x)}{g'(x)}$$

(Again, when the above conditions hold ***and*** both derivatives exist!) Apply repeatedly as needed and as long as both conditions hold.

P.S. – You've gotta know how important this is since I've stooped to Word to make it look nice!