L'Hopital's Rule.

It is applicable while calculating limits of indeterminate forms of the type $\frac{0}{0}$, $\frac{\infty}{\infty}$. If the functions $f(x)$ & $g(x)$ are differentiable in certain neighbourhood of a point. a, except, may be, at the point a itself. & $g'(x) \neq 0$ and if

$$\lim_{x \to a} f(x) = \lim_{x \to a} g(x) = 0$$

or

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

then

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

provided the limit $\lim_{x \to a} \frac{f'(x)}{g'(x)}$ exists.

Indeterminate forms of the type $0 . \infty$ or $\infty - \infty$ are reduced to forms of type $\frac{0}{0}$ or $\frac{\infty}{\infty}$ by algebraic transformation.

Indeterminate forms of the type 1^{∞}, ∞^{0}, or 0^{0} are reduced to forms of the type $0 . \infty$. by taking logarithms or by transformation

$$[f(x)]^{\phi(x)} = e^{\phi(x) . \ln f(x)}$$