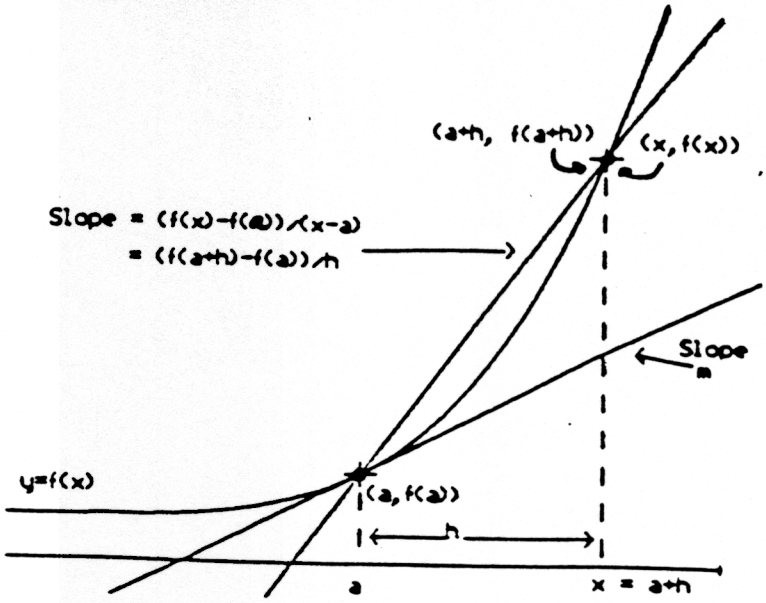

$$m = \lim_{x \to a} \frac{f(x) - f(a)}{x - a} = \lim_{h \to 0} \frac{f(a+h) - f(a)}{h}, \quad \text{provided the limit exists}$$

$y = f(x)$ (Geometric)	$\frac{f(x)-f(a)}{x-a} = \frac{f(a+h)-f(a)}{h}$ Slope of secant line	m Slope of tangent line
If y = position of a moving point along straight line (ft) at time x (sec)	average rate of change of position = average velocity (ft/sec) over the time interval $[a, x] = [a, a+h]$	Instantaneous velocity when t=a (ft/sec)
If y = size of population (millions) at time x (yrs)	average rate of change of population (millions/yr) over the time interval $[a, x] = [a, a+h]$	Instantaneous rate of change of population when t=a (millions/yr)
If y = cost ($) to produce x gallons of gasoline	average rate of change of cost to produce gasoline ($/gallon) over the interval $[a, x] = [a, a+h]$	Instantaneous rate of change in production cost when x=a ($/gallon)
If y is any quantity (measured in "glips") expressed in terms of x (measured in "glops")	average rate of change of y with respect to x ("glips/glop") over the interval $[a, x] = [a, a+h]$	Instantaneous rate of change of y with respect to x when x=a ("glips/glop")