
IN-CLASS ACTIVITY : PRODUCT RULE

1. Using the definition of derivative, compute the derivative of $f(x) = \frac{1}{x+1}$.
2. Compute the derivative of the following functions :

i) $f(x) = (x+2)(2x^2 - 3)$	vi) $f(x) = x^2 e^x$
ii) $f(x) = x^4 + \frac{2}{x}$	vii) $f(x) = \cos^2(x)$
iii) $f(x) = x^2 \left(\frac{2}{x^2} + \frac{5}{x^3} \right)$	viii) $f(x) = e^x \cos(x)$
iv) $f(x) = 3x \left(18x^4 + \frac{13}{x+1} \right)$	ix) $f(x) = \sqrt{x} e^x$
v) $f(x) = \frac{4x^3 - 2x + 1}{x^2}$	x) $f(x) = x^2 \cos(x) \sin(x)$
	xi) $f(x) = e^x \sin^2(x)$
3. Let $f(x)$ and $g(x)$ be differentiable functions such that $f'(1) = 3$ and $g'(1) = 2$.
 - (a) Compute $h'(1)$ where $h(x) = xf(x) + 4g(x)$
 - (b) Compute $h'(1)$ where $h(x) = 2x + f(x)g(x)$
4. Find the equation of the tangent line to the graph of the function $f(x) = \sin(x)(3x - x^2)$ at $x = 0$.
5. Find all values of x_0 such that the tangent line to the graph of $f(x) = x - 2\cos(x)$ at x_0 is parallel to $y = x$.