Lecture Twelve Practice

Practice problems

Abstract. *Practice problems for Lecture Twelve Content*

Problem. 1 : Compute the following derivative:

$$\frac{d}{dx}(9\ln(x) - 7) = \boxed{}\ ?$$

Problem. 2 : Compute the following derivative:

$$\frac{d}{dx}(-\ln(5x + 3)) = \boxed{}\ ?$$

Problem. 3 : Compute the following derivative:

$$\frac{d}{dx}\left(-3x^2\ln(x)\right) = \boxed{}\ ?$$

Problem. 4 : Compute the following derivative:

$$\frac{d}{dx}\left(-\frac{2\cos(x)}{\ln(x)}\right) = \boxed{}\ ?$$

Problem. 5 : Use logarithmic differentiation to find:

$$\frac{d}{dx}\frac{(x+1)^2}{\sqrt{x^2+1}} = \boxed{}\ ?$$

Problem. 6 : Use logarithmic differentiation to find:

$$\frac{d}{dx}x^{\sin(x)} = \boxed{}\ ?$$

Problem. 7 : Use logarithmic differentiation to find:

$$\frac{d}{dx}\sqrt{\frac{(x-1)}{x+1}} = \boxed{}\ ?$$

Problem. 8 : Use logarithmic differentiation to find:

$$\frac{d}{dx}\frac{\sqrt[3]{x-2}}{(1+x^2)^4} = \boxed{}\ ?$$

Problem. 9 : Find the equation of the line tangent to $f(x) = 8\ln(x)$ at $x = 1$.

$$y = \boxed{}\ ?$$

Problem. 10 : Implicitly derive the expression $7\ln\left(x^2y^2\right) = 6$ and solve for $\frac{dy}{dx}$.

$$\frac{dy}{dx} = \boxed{}\ ?$$

Problem. 11 : Compute the first and second derivatives for the function $f(x) = \sqrt{x}\ln(x)$.

$f'(x) =$?

$f''(x) =$?

Problem. 12 : Compute the first and second derivatives for the function $f(x) = x^4\ln(x)$.

$f'(x) =$?

$f''(x) =$?