

1. Compute the derivative:

(a) $(\sin^{-1}(x))^2 + \cos(x)$ (b) $\log_3(4x^2 - x)$ (c) $\pi(e^x)$ (d) $\tan(x)^{\sin(x)}$

2. Let $f(x) = \tan^{-1}(x^2 - 3)$. Write the equation of the line tangent to $f(x)$ at $x = 2$.

3. Let C be the curve $y^{2/3} + x^{2/3} = 8$. Write the equation of the line tangent to C at $y = 8$.

4. Let

$$f(\theta) = \frac{e^\theta - e^{-\theta}}{2} \quad g(\theta) = \frac{e^\theta + e^{-\theta}}{2}.$$

(a) Show that $f'(\theta) = g(\theta)$ and $g'(\theta) = f(\theta)$.

(b) Find the equation of the lines tangent to $f(\theta)$ and $g(\theta)$ at $\theta = 0$.