1. Let \( f(x) = x^2 + 3 \).
   
   (a) Use the limit definition of the derivative to find \( f'(1) \).

   (b) Write down an equation for the tangent line at the point (1, 4).
2. Differentiate the following functions.

(a) \( f(x) = (x^3 + 1)^5 \)

(b) \( f(x) = \tan(\sqrt{x}) \)
(c) $f(x) = x^2 \ln x + e^{\cos x}$

(d) $f(x) = \arcsin(x^4)$
(e) $f(x) = \sin \left( \frac{x^2 + 1}{3x + 4} \right)$
3. Use logarithmic differentiation to differentiate \( f(x) = x^{\cos x} \).
4. Find $y'$ for the curve $x \sin y + e^x = (2y + 1)^3$. 
5. Find the absolute maximum and absolute minimum of \( f(x) = 2x^3 + 15x^2 + 24x + 1 \) on the interval \([-2, 2]\).