

Using the definition, find the slope and the equation of the tangent line to the given curve at the given point:

$$f(x) = x^2 + 2x - 3, \quad x = 3 \quad g(x) = \sqrt{2x + 1}, \quad x = 1 \quad h(x) = \frac{3}{-2x + 1}, \quad x = 2$$

Find the derivatives of the following functions from the definition:

$$f(x) = 2x^2 - 3x + 1 \quad g(x) = \sqrt{3x - 4} \quad h(x) = \frac{1}{2x - 2}$$

Find the derivatives of the following functions:

$$f(x) = 5x^7 + 3x^4 - 2x^3 + 3x + \frac{1}{x} \quad g(x) = 4x^3 + 3x^{\frac{5}{2}} - \sqrt{x}$$
$$h(x) = x^3 - \frac{2}{\sqrt{x}} + \frac{3}{x^4} + 2x^{-3/5} \quad k(x) = \sqrt{x + 1}$$

Find value(s) for a and b , that make the following functions differentiable everywhere.

$$f(x) = \begin{cases} x^2 + a & x > 1 \\ bx & x \leq 1 \end{cases} \quad g(x) = \begin{cases} ax^2 - 3x + 1 & x > 2 \\ bx + 2 & x \leq 2 \end{cases}$$