

The Derivative of a Function- HW Problems

1. Find the slope of the tangent line to the graph of the function at the given point using a limit definition of a derivative.

a. $f(x) = 2x - 1$ at $(2,3)$

b. $g(x) = x^2 + 2x$ at $(-1, -1)$

c. $f(x) = x^3$ at $(1,1)$

d. $f(x) = \sqrt{x+1}$ at $(3,2)$

2. Find an equation of the tangent line to the graph of the function at the given point using a limit definition of the derivative.

a. $f(x) = x^3$ at $(1,1)$ (you can use the result from problem 1c)

b. $g(x) = \frac{2}{x}$ at $(2,1)$

c. $f(x) = 2x - \frac{1}{x}$ at $(1,1)$

3. Calculate $f'(x)$ using a limit definition of a derivative. For what values of x does $f'(x)$ exist?

a. $f(x) = 2x^2 - x$

b. $g(x) = 2x - x^3$

c. $f(x) = \frac{1}{x^2}$

d. $g(x) = \sqrt{-1 - 3x}$