

Problem 1

Using the definition of the derivative as a limit, find $f'(x)$ when $f(x) = \frac{1}{x^2 - 1}$. (you may not use the chain rule, or the power rule... or the quotient rule)

Problem 2

Using the definition of the derivative as a limit, find $f'(x)$ when $f(x) = \sqrt{x^2 + 1}$. (you may not use the chain rule, or the power rule... or quotient rule)

Problem 3

Let $f(x) = 2x^3 - \frac{1}{x^2} + \frac{3}{\sqrt[3]{x}}$. Find $f'(x)$ using whatever method you want.

Problem 4

Find $\frac{d}{dx} \left((3x^2 + 4x + 5)(6x^3 + 6x^2 + 8x + 9) \right)$ using whatever method you want.

Problem 5

Find $\frac{d}{dx} \left(\frac{x^2 + \frac{1}{x}}{\sqrt[3]{x} + 2x + 2} \right)$ using whatever method you want.

Problem 6

Find the x -coordinates where $f(x) = x^3 + 2x^2 + x + 1$ has horizontal tangent lines.