

Using Algebra and the Product Rule to take a derivative

J) $y = (x^2 + 3)(x^3 - x)$

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Alg

$y = x^5 - x^3 + 3x^3 - 3x$

$y = x^5 + 2x^3 - 3x$

Calc

$y' = 5x^4 + 6x^2 - 3$

(1st fct) $\left(\frac{dy}{dx}\right)$ (2nd fct) + (2nd fct) $\left(\frac{dy}{dx}\right)$ (1st fct)

$y' = (x^2 + 3)(3x^2 - 1) + (x^3 - x)(2x)$

$y' = 3x^4 - x^2 + 9x^2 - 3 + 2x^4 - 2x^2$

$y' = 5x^4 + 6x^2 - 3$

Using Algebra and the Quotient Rule to take a derivative

K) $f(x) = \frac{x^3 + 9}{x}$

K) $f(x) = \frac{(x^3 + 9)}{(x)}$

Alg

$f(x) = \frac{x^3}{x} + \frac{9}{x}$

Alg

$f(x) = x^2 + 9x^{-1}$

Calc

$f'(x) = 2x - 9x^{-2}$

Calculus

$f'(x) = \frac{x(3x^2) - (x^3 + 9)(1)}{x^2}$

$f'(x) = \frac{3x^3 - x^3 - 9}{x^2}$

$f'(x) = \frac{2x^3 - 9x^0}{x^2}$

Take the Derivative of the function

L) $y = (x^2 + x + 2)(x^5 + x^3 + 5x)$

$y = x^7 + x^5 + 5x^3 + x^6 + x^4 + 5x^2 + 2x^5 + 2x^3 + 10x$

$y = x^7 + x^6 + 3x^5 + x^4 + 7x^3 + 5x^2 + 10x$

$y' = 7x^6 + 6x^5 + 15x^4 + 4x^3 + 21x^2 + 10x + 10$

Take the Derivative of the function

M) $f(x) = \frac{x^4}{2-x^2}$

Calc
Quotient
Rule

→ $f'(x) = \frac{(2-x^2)(4x^3) - (x^4)(-2x)}{(2-x^2)^2}$

Alg →

$8x^3 - 4x^5 + 2x^5$

$f'(x) = \frac{-2x^5 + 8x^3}{(2-x^2)^2}$

O) $f(x) = \frac{(x+3)(x-4)}{(x+1)(x-3)}$

$f(x) = \frac{x^2 - x - 12}{x^2 - 2x - 3}$

Quotient Rule

N) $f(x) = (5-x^2)(3-x)^{-1}$

$f(x) = \frac{5-x^2}{3-x}$

$f'(x) = \frac{(3-x)(-2x) - (5-x^2)(-1)}{(3-x)^2}$

$-6x + 2x^2 + 5 - x^2$

$f'(x) = \frac{x^2 - 6x + 5}{(3-x)^2}$

P) $f(x) = \frac{\sqrt[3]{x+1}}{\sqrt[3]{x-1}}$

$f(x) = x^{-1}$
→ $f'(x) = -x^{-2}$

$f(x) = \frac{1}{x}$

$f'(x) = \frac{x(0) - 1(1)}{x^2}$

$= \frac{-1}{x^2}$