Basic Derivative Rules
2.4 – Quotient Rule

Quotient Rule

Newton's Notation

$$\left(\frac{f}{g}\right)' = \frac{f' \cdot g - f \cdot g'}{g^2}$$

Ex A: Use the Quotient Rule and Newton's Notation.

#1) $\left(\frac{x^{10}}{x^4}\right)'$

#2) If $y = \frac{x^3}{x^2-4}$, then find y'.

Quotient Rule

Leibniz's Notation

$$\frac{d}{dx}\left(\frac{f}{g}\right) = \frac{\frac{d}{dx}(f) \cdot g - f \cdot \frac{d}{dx}(g)}{(g)^2}$$

Ex B: Use the Quotient Rule and Leibniz's Notation.

#1) If $y = \left(\frac{x^5-2}{x^3-1}\right)$, then find $\frac{dy}{dx}$.

#2) $\frac{d}{dx}\left(\frac{x^3+x}{x^3-1}\right)$

Ex C: Answer the following word problems.

Drinking Water

Gnadenhutten must purify its drinking water. If the cost of purifying a gallon of water to a purity of x percent is $C(x) = \frac{2}{100-x}$ dollars for 80 < x < 100, find the rate of change of the purification costs when the purity is 92% and 98% and interpret your answer.