Basic Derivative Rules
2.4A – Quotient Rule

A: Find the derivative of each function using Newton's Notation.

#1) $y = \frac{x^5-1}{x^3}$

#2) $y = \frac{x-1}{x+1}$

#3) $y = \frac{3x^2+5}{x+7}$

#4) $y = \frac{x^2-1}{x^2+1}$

#5) $y = \frac{x^4-1}{x+1}$

B: Find the derivative of each function using Leibniz's Notation.

#6) $y = \frac{x^2+3x-5}{x+1}$

#7) $y = \frac{x^3-2x^2}{x-2}$

#8) $y = \frac{x^4+2x^2+1}{x^2+1}$

#9) $y = \frac{x^2-9}{x-3}$

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Amp'd

#10) The number of bottles of Amp Energy drink that college students will buy in a month at a price of p dollars per bottle (for $p >$ \$0.50) is $B(p) = \frac{100}{p+6}$. Find the rate of change of bottles purchased when the price is \$2 and interpret your answer.

EPA

#11) According to the EPA, the mpg of subcompact cars is $mpg(v) = \frac{-15v^2+1125v}{v^2-100v+3500}$ where v is the speed in miles per hour (for $35 \leq v \leq 65$).

a. Find $mpg'(v)$. *You don't need to simplify.*
b. Find $mpg'(45)$, $mpg'(55)$, $mpg'(65)$ using a calculator and interpret your answers.
c. What valuable lesson can be gained from the answers from part b?