PDF 2.050 Quotient Rule

The Quotient Rule states

If $h(x) = \frac{f(x)}{g(x)}$, then

$h'(x) = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$, $g(x) \neq 0$

Newton Notation

$\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{\left(\frac{du}{dx}\right)v - u\left(\frac{dv}{dx}\right)}{v^2}$

Leibniz Notation

Proof:

Example 1

Determine the derivative of $\mathrm{h(x)} = \frac{3x-4}{x^2+5}$

Example 2

Determine the equation of the tangent to $\mathrm{f(x)} = \frac{2x}{x^2+1}$ at $x = 0$.

Example 3

Determine the coordinates of each point on the graph of $f(x) = \frac{2x+8}{\sqrt{x}}$ where the tangent is horizontal.