

The Quotient Rule

In this worksheet, we will derive a formula for the derivative of a function of the form $\frac{f(x)}{g(x)}$. From here on out, let $f(x)$ and $g(x)$ be differentiable functions.

1. Let $Q(x) = \frac{f(x)}{g(x)}$. By multiplying both sides of this equation by $g(x)$ and then applying the product rule, find a formula for $f'(x)$ in terms of $Q(x)$, $Q'(x)$, $g(x)$, and $g'(x)$.

2. Using the formula you came up with in problem 1, solve for $Q'(x)$, and then substitute $Q(x) = f(x)/g(x)$ to get a formula for the derivative of $Q(x)$ in terms of $f(x)$, $f'(x)$, $g(x)$, and $g'(x)$.