

Proof of the quotient rule,  
given the Product rule.

Let  $q(x) = \frac{t(x)}{b(x)}$        $q$  is for "quotient"

So  $t(x) = q(x) \cdot b(x)$

The Product rule says...

$$t'(x) = q'(x) \cdot b(x) + q(x) \cdot b'(x)$$

Solve for  $q'(x)$ :

$$q'(x) \cdot b(x) = t'(x) - q(x) \cdot b'(x)$$

$$q'(x) = \frac{t'(x) - q(x) \cdot b'(x)}{b(x)} = \frac{t'(x) \cdot b(x) - \cancel{q(x) \cdot b(x)} \cdot b'(x)}{(b(x))^2}$$

*I multiplied top and bottom by  $b(x)$ .*

*$q \cdot b = t$*

So, finally,

$$q'(x) = \frac{t'(x) \cdot b(x) - t(x) \cdot b'(x)}{(b(x))^2}$$