

Calculus I, Section 3.2, #24  
The Product and Quotient Rules

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Differentiate.<sup>1</sup>

$$F(t) = \frac{At}{Bt^2 + Ct^3}$$

This function is a quotient, so we'll use quotient rule.

$$F(t) = \frac{At}{Bt^2 + Ct^3}$$

then

$$\begin{aligned} F'(t) &= \frac{(Bt^2 + Ct^3) \cdot A - At \cdot (2Bt + 3Ct^2)}{(Bt^2 + Ct^3)^2} \\ &= \frac{ABt^2 + ACt^3 - 2ABt^2 - 3ACt^3}{(t^2(B + Ct))^2} \\ &= \frac{At^2(B + Ct - 2B - 3Ct)}{t^4(B + Ct)^2} \\ &= \frac{At^2(-B - 2Ct)}{t^4(B + Ct)^2} \\ &= -\frac{A(B + 2Ct)}{t^2(B + Ct)^2} \end{aligned}$$

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<sup>1</sup>Stewart, *Calculus, Early Transcendentals*, p. 188, #24.