

Name: SOLUTIONS

Sec. 3.2 - Product and Quotient Rules

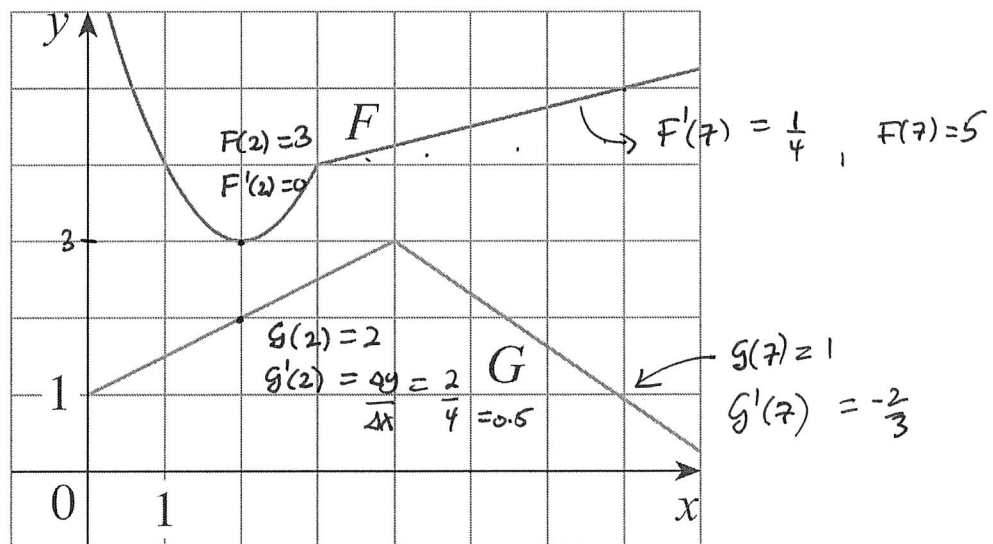
Math 251

1. If $f(x) = e^x g(x)$, where $g(0) = 2$ and $g'(0) = 5$, find $f'(0)$.

$$f'(x) = e^x g'(x) + g(x) e^x$$

$$\begin{aligned} f'(0) &= e^0 g'(0) + g(0) e^0 \\ &= 1 \cdot 5 + 2 \cdot 1 = 7 \end{aligned}$$

2. Let $P(x) = F(x)G(x)$ and $Q(x) = F(x)/G(x)$ where F and G are functions whose graphs are shown below.



Find

- (a) $P'(2)$

$$P'(x) = F'(x)G(x) + G'(x)F(x)$$

$$P'(2) = F'(2)G(2) + G'(2)F(2) = 0 \cdot 3 + \frac{1}{2} \cdot 3 = \underline{1.5}$$

- (b) $Q'(7)$

$$Q'(x) = \frac{G(x)F'(x) - F(x)G'(x)}{(G(x))^2} \Rightarrow Q'(7) = \frac{G(7) \cdot F'(7) - F(7)G'(7)}{(G(7))^2}$$

$$\frac{1 \cdot \frac{1}{4} - 5 \left(-\frac{2}{3}\right)}{12} = \frac{\frac{1}{4} + \frac{10}{3}}{12} = \frac{\frac{43}{12}}{12}$$