

## 2.2 – The Product and Quotient Rules

Let  $f$  and  $g$  be differentiable functions of  $x$  such that  $g \neq 0$ .

- Product Rule:  $\frac{d}{dx}[f(x)g(x)] =$

- Quotient Rule:  $\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] =$

1. Find the derivative of each function.

a.  $g(x) = 2x^{5/3} - 3x^2e^x$

b.  $h(u) = \frac{3u^2}{u-4}$

2. Calculate  $\left. \frac{d^2P}{dt^2} \right|_{t=4}$  given  $P = \sqrt{t} e^t$ .

3. Find an equation of the line tangent to  $f(x) = \frac{\sqrt{x}}{1-2x^2}$  at  $x = 1$ .

4. Find an equation for the line tangent to  $g(x) = \frac{3-e^x}{f(x)}$  at  $x = 0$   
given that  $f(0) = 4$  and  $f'(0) = -3$ .