The Product Rule

 $[f(x) \cdot g(x)]' = f'(x) \cdot g(x) + f(x) \cdot g'(x)$

provided f and g are differentiable functions.

Example: Find the critical numbers of $f(x) = x^4 e^x$.

The Quotient Rule
$$\left[\frac{f(x)}{g(x)}\right]' = \frac{f'(x) \cdot g(x) - f(x) \cdot g'(x)}{[g(x)]^2}$$

provided f and g are differentiable and $g(x) \neq 0$.

Example:

Determine where the graph of the function $q(x) = \frac{x}{x^2 + 8}$ has horizontal tangents.

section 5.2