Solutions

For full credit you must (NEATLY) show your work. Partial credit may be given for incorrect solutions if sufficient work is shown.

Find $f'(x)$ for each function

1. (5 pts)

$$f(x) = x^3 e^x$$

Product rule

$$f'(x) = 3x^2 e^x + e^x x^3$$

2. (5 pts)

$$f(x) = \ln(x^2 - 3x + 8)$$

Chain Rule

$$f'(x) = \frac{1}{x^2 - 3x + 8} \cdot (2x - 3)$$

Bonus (1 pt : on blackboard)

Find the 100th derivative of $f(x) = xe^x$

1st derivative $f'(x) = e^x + xe^x$ [product rule]

2nd derivative $f''(x) = e^x + (e^x + xe^x) = 2e^x + xe^x$

3rd derivative $f'''(x) = 2e^x + (e^x + xe^x) = 3e^x + xe^x$

⋮

100th derivative $f^{(100)}(x) = 100e^x + xe^x$