

Each problem is worth 5 points. For full credit indicate clearly how you reached your answer.

1. State the Quotient Rule.

If $f(x)$ and $g(x)$ are differentiable and $g(x) \neq 0$
then

$$\left(\frac{f}{g}\right)'(x) = \frac{f'(x)g(x) - g'(x)f(x)}{[g(x)]^2} \quad \square \quad \text{Great}$$

2. Find the derivative of $f(x) = x^3 e^x$.

Product: $(fg)' = f'g + fg'$

$$f(x) = \overset{f}{x^3} \overset{g}{e^x}$$

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

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

Excellent

3. Find the derivative of $h(r) = \frac{r^2}{2r+1}$.

$$h'(r) = \frac{(r^2)' \cdot (2r+1) - r^2 \cdot (2r+1)'}{(2r+1)^2}$$

$$= \frac{2r \cdot (2r+1) - r^2 \cdot 2}{(2r+1)^2}$$

$$= \frac{4r^2 + 2r - 2r^2}{(2r+1)^2}$$

$$= \frac{2r(r+1)}{(2r+1)^2}$$

Well done