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
   \[
   \left( \frac{f}{g} \right)'(x) = \frac{f'(x)g(x) - g'(x)f(x)}{[g(x)]^2}
   \]

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

   \[
   f(x) = \frac{\frac{d}{dx} x^3}{\frac{d}{dx} e^x}
   \]
   \[
   = (x^3)'(e^x) + (x^3)(e^x)'
   \]
   \[
   = (3x^2)(e^x) + (x^3)(e^x)
   \]

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

   \[
   h'(r) = \frac{(r^2)'(2r+1) - r^2(2r+1)'}{(2r+1)^2}
   \]
   \[
   = \frac{2r \cdot (2r+1) - r^2 \cdot 2}{(2r+1)^2}
   \]
   \[
   = \frac{4r^2 + 2r - 2r^2}{(2r+1)^2}
   \]
   \[
   = \frac{2r(2r+1)}{(2r+1)^2}
   \]
   \[
   = \frac{2r}{2r+1}
   \]