

These are alleged answers. For each error herein, you get extra-credit points for being the first to report it by e-mail.

1 (a) If $f(x) = \frac{2}{x^3} + \ln(x)$, then $f'(x) = -6x^{-4} + x^{-1} = \frac{x^3 - 6}{x^4}$.

One probably ought to begin by rewriting the function before attempting to find its derivative:

$$f(x) = 2x^{-3} + \ln(x),$$

and then proceed as above.

(b) If $g(x) = 4x^3 \ln(x)$, then $g'(x) = 4x^2\{3 \ln(x) + 1\}$.

Think product rule:

$$\begin{aligned} g'(x) &= 4\{(x^3)' \ln(x) + x^3 \ln'(x)\} \\ &= 4\{3x^2 \ln(x) + x^3 x^{-1}\} \\ &= 4\{3x^2 \ln(x) + x^2\} \\ &= 4x^2\{3 \ln(x) + 1\} \end{aligned}$$

which yields the above answer.

(c) If $h(x) = \frac{1 - e^x}{1 + e^x}$, then $h'(x) = \frac{-2e^x}{(1 + e^x)^2}$.

Think quotient rule:

$$\begin{aligned} h'(x) &= \frac{(1 - e^x)'(1 + e^x) - (1 - e^x)(1 + e^x)'}{(1 + e^x)^2} \\ &= \frac{(-e^x)(1 + e^x) - (1 - e^x)(e^x)}{(1 + e^x)^2} \\ &= \frac{(-e^x)\{(1 + e^x) + (1 - e^x)\}}{(1 + e^x)^2} \\ &= \frac{-2e^x}{(1 + e^x)^2} \end{aligned}$$