

I. Find the derivative of each of the following. **Do not simplify** your answers.

1.  $y = x^4 + x^e + e^x + e^\pi + \ln x + \ln 7$

2.  $y = (3x + \ln x)e^x$

3.  $y = \frac{\ln x}{x^3 - 2x}$

4.  $y = e^{x^4 + 2x^3 + 7}$

5.  $y = \ln(x^3 + 5x - 2)$

6.  $y = \sqrt{\ln(8x + 20)}$

7.  $y = \ln(\ln(x^2 + e^x))$

II. Find **and simplify** the **second** derivative of  $y = e^x(5x + 2)$ .

III. Suppose  $g(4) = 7$  and  $g'(4) = -6$ . Find  $h'(4)$  if  $h(x) = \ln(x^2 + g(x))$ .