Please clearly show all your work on the following problems.

1) Find the integral below.

\[ \int x \cos(3x) \, dx = \frac{x \sin(3x)}{3} - \int \frac{\sin(3x)}{3} \, dx = \frac{x \sin(3x)}{3} + \frac{\cos(3x)}{9} + C \]

\[ u = x \quad dv = \cos(3x) \, dx \]
\[ du = dx \quad v = \frac{\sin(3x)}{3} \]

2) Find the integral below.

\[ \int \sinh(x) \, e^x \, dx \]

This problem didn’t work out as intended, so full credit was given for any attempt that started out correctly.

What I intended was a double-integration-by-parts where you solve for the original answer. What actually happened was that the answer cancelled out and this technique doesn’t work.

(What would work is using a hyperbolic trig formula to turn \( \sinh(x) \) into exponentials, but this course isn’t going that direction)