

1. (a) (4 points) $I = \int e^x \cos(x) dx$ can be evaluated using repeated integration by parts to set up an equation for I . Solve for I in this way.

(b) (2 points) $I = \int e^x \cosh(x) dx$ **cannot** be evaluated using the method in the first part. Try evaluating in that way and explain what goes wrong.

(c) (4 points) Use the definition of $\cosh(x)$ to change the form of $e^x \cosh(x)$ and then use this new form to evaluate $I = \int e^x \cosh(x) dx$.

2. (5 points) Evaluate $I = \int_0^1 \frac{2x}{(x^2 - 4)(x + 3)} dx$ using partial fractions. Show at least a little bit of work when calculating the parts. Simplify your answer.

3. (5 points) Does $I = \int_1^\infty \frac{2}{\sqrt{x^3 + 4}} dx$ diverge or converge? Defend your answer with rigorous work.