Write neatly on this sheet or on a separate sheet of paper.

1. Compute $\int_{-\infty}^{0} \frac{x}{1+x^2} dx$ and $\int_{0}^{\infty} \frac{x}{1+x^2} dx$. What does this say about $\int_{-\infty}^{\infty} \frac{xdx}{1+x^2}$?

2. Compute $\int_{1}^{2} \frac{dt}{\sqrt{t^2 - 1}}$.

3. Compute $\int_{0}^{1} \ln(t) dt$. 
4. Show that \( \int_{1}^{\infty} \frac{dx}{x^2-4} \) is not a finite number. What answer do you get if you forget that the integrand has an asymptote at 2 and fail to split the integral up there?

5. Compute \( \int_{1}^{\infty} \frac{dx}{1+e^{2x}} \)