

Evaluate the improper integral or state that it diverges.

1)  $\int_1^{\infty} \frac{dx}{x^3}$

2)  $\int_0^3 x \ln 4x \, dx$

3)  $\int_{-\infty}^{\infty} e^{9x} dx$

4)  $\int_{-\infty}^{-7} \frac{dx}{x^2 - 36}$