

9. [12 points] Determine whether the following integrals converge or diverge. If the integral converges, circle “converges”, find its exact value (i.e. no decimal approximations), and write the exact value on the answer blank provided. If the integral diverges, circle “diverges” and justify your answer. In either case, **you must show all your work and indicate any theorems you used to conclude convergence or divergence of the integrals.** Any direct evaluation of integrals must be done **without using a calculator.**

a. [6 points] $\int_{-\infty}^{\infty} \frac{2}{(1+x^4)^{1/4}} dx$

Diverges

Converges to _____

b. [6 points] $\int_1^e \frac{x^3 - 3x^3 \ln(x) - 1}{x(x^3 - 1)^2} dx$

Hint: $\frac{d}{dx} \left(\frac{\ln(x)}{x^3 - 1} \right) = \frac{x^3 - 3x^3 \ln(x) - 1}{x(x^3 - 1)^2}$

Diverges

Converges to _____