

1. Determine whether the following integral converge or diverge. If they converge, what do they converge to?

a. $\int_0^2 \frac{1}{x^{1/3}} dx$

b. $\int_1^2 \frac{1}{\sqrt{4-x^2}} dx$

c. $\int_{-1}^0 \frac{1}{x(x+1)} dx$

d. $\int_0^3 \frac{e^x}{e^x-1} dx$

2. Use the comparison test to determine whether the following integrals converge or diverge.

e. $\int_0^{\infty} \frac{x^2}{x^5+1} dx$

f. $\int_2^{\infty} \frac{x\sqrt{x}}{x^2-1} dx$

g. $\int_0^{\infty} \frac{dx}{\sqrt{x+x^2}}$

h. $\int_2^{\infty} \frac{dx}{\sqrt{x} \ln x}$

3. Find the lengths of the given curves

i. $y = ax + b$ from $x = A$ to $x = B$.

j. $y^2 = (x-1)^3$ from $(1,0)$ to $(2,1)$.