

Worksheet

Problem 1. Evaluate the integral by interpreting it in terms of areas.

a) $\int_{-2}^0 (|x + 1| + 1) dx$

b) $\int_{-2}^4 \sqrt{9 - (x - 1)^2} dx$

c) $\int_0^2 (x - 1) dx.$

Problem 2. Using just the properties of integral (don't calculate it) show

a) $1 \leq \int_1^2 x^n dx \leq 2^n$

b) $0 \leq \int_1^{\pi/2} \sin x \ln x dx \leq \frac{1}{2}(\pi - 2)(\ln \pi - \ln 2)$

c) for any $a < b$ we have $a - b \leq \int_a^b \sin x dx \leq b - a.$

Problem 3. Interpret the following limit as a definite integral $\lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{(n+i)^n}{n^{n+1}}.$