

Ex. 1 Check the convergence of series: a) $\sum_{n=2}^{\infty} \frac{1}{n \ln n}$, b) $\sum_{n=1}^{\infty} (-1)^n \frac{2^n}{n!}$.

Ex. 2 Write the necessary condition of convergence of a series. Give an example of series which doesn't fulfill this condition.

Ex. 3 Describe two applications of double integral.

Ex. 4 Find the absolute minimum and absolute maximum of $f : \mathbf{R}^2 \rightarrow \mathbf{R}$, $f(x, y) = x^2 - y^2$ on the plane described by $x^2 + y^2 \leq 1$.

Ex. 5 Evaluate:

a) $\iint_D x^2 + y^2 \, dx dy$, over the triangular region D , whose vertices are $(0, 0)$, $(1, 0)$, and $(0, 1)$

b) $\iiint_V \frac{1}{\sqrt{x^2 + y^2 + z^2}} \, dx dy dz$, where $V = \{(x, y, z) : 1 \leq x^2 + y^2 + z^2 \leq 4 \text{ and } x \leq 0\}$.