Alternating Series Convergence
Proof Without Words

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Theorem *An alternating series* $a_1 - a_2 + a_3 - a_4 + a_5 - a_6 + a_7 - a_8 + \cdots$ *converges to a sum* S *if* $a_1 \geq a_2 \geq a_3 \geq a_4 \geq \cdots \geq 0$ *and* $a_n \to 0$. *Moreover, if* $s_n = a_1 - a_2 + a_3 - \cdots \pm a_n$ *is the* n*th partial sum then* $s_{2n} < S < s_{2n+1}$.

PROOF