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New Inequalities About Convex Functions

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Abstract: If f is a convex function and $x_1,\ldots,x_n$ or $a_1,\ldots,a_n$ lie in its domain the following inequalities are proved

$$\sum_{i=1}^{n} f(x_i) - f\left(\frac{x_1+\cdots+x_n}{n}\right) \geq \frac{n-1}{n}\left[f\left(\frac{x_1+x_2}{2}\right)+\cdots+f\left(\frac{x_{n-1}+x_n}{2}\right)+f\left(\frac{x_n+x_1}{2}\right)\right]$$

and

$$(n-1)\left[f(b_1)+\cdots+f(b_n)\right] \leq n\left[f(a_1)+\cdots+f(a_n)-f(a)\right],$$

where $a=\frac{a_1+\cdots+a_n}{n}$ and $b_i=\frac{na-a_i}{n-1}$, $i=1,\ldots,n$.

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