

# mean square deviation\*

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If  $f$  is a Riemann integrable real function on the interval  $[a, b]$  which is wished to be approximated by another function  $\varphi$  with the same property, then the mean

$$m = \frac{1}{b-a} \int_a^b [f(x) - \varphi(x)]^2 dx$$

is called the *mean square deviation* of  $\varphi$  from  $f$ .

For example, if  $\sin x$  is approximated by  $x$  on  $[0, \frac{\pi}{2}]$ , the mean square deviation is

$$\frac{2}{\pi} \int_0^{\frac{\pi}{2}} (\sin x - x)^2 dx \approx 0.04923.$$

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