Past Year JEE Questions

Questions

Quetion: 01

Let $fk(x) = \frac{1}{k}\left(\sin^k x + \cos^k x\right)$ where $x \in R$ and $k \geq$.

Then $f4(x) - f6(x)$ equals

A. $\frac{1}{4}$

B. $\frac{1}{12}$

C. $\frac{1}{6}$

D. $\frac{1}{3}$

Solutions

Solution: 01

Explanation

Let $f_k(x) = \frac{1}{k}\left(\sin^k x + \cos^k . x\right)$

Consider

$f4(x) - f6(x)$

$= \frac{1}{4}\left(\sin^4 x + \cos^4 x\right) - \frac{1}{6}\left(\sin^6 x + \cos^6 x\right)$

$= \frac{1}{4}\left[1 - 2\sin^2 x\cos^2 x\right] - \frac{1}{6}\left[1 - 3\sin^2 x\cos^2 x\right]$

$= \frac{1}{4} - \frac{1}{6} = \frac{1}{12}$