

M.M.:34

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Time : 50 Mints

1. Let a,b,c be three sides of a triangle . Suppose a and b are the roots of the equation $x^2 - (c+4)x + 4(c+2) = 0$ and the largest angle of the triangle is θ degrees. Find θ [4]
2. Find the value of the definite integral $\int_0^\pi |\sqrt{2}\sin x + 2\cos x| dx$ [4]
3. Let $\tan\alpha.\tan\beta = \frac{1}{\sqrt{2005}}$ Find the value of $(1003 - 1002\cos 2\alpha)(1003 - 1002\cos 2\beta)$ [5]
4. $\int_1^{\frac{1+\sqrt{5}}{2}} \frac{x^2+1}{x^4-x^2+1} \ln\left(1+x-\frac{1}{x}\right) dx$ [6]
5. Two vectors \vec{e}_1 and \vec{e}_2 with $|\vec{e}_1| = 2$ and $|\vec{e}_2| = 1$ and angle between \vec{e}_1 and \vec{e}_2 is $\frac{\pi}{3}$ The angle between $2t\vec{e}_1 + 7\vec{e}_2$ and $\vec{e}_1 + t\vec{e}_2$ belongs to the interval $(90^\circ, 180^\circ)$ Find the range of t. [7]
6. A function f(x) continuous on R and periodic with period 2π satisfies $f(x) + \sin x.f(x+\pi) = \sin^2 x$ Find f(x) and evaluate $\int f(x) dx$. [8]