Question

Check whether the function f, defined by :
f (x)= cos 2x + tan x,
is periodic. If so, find its period. If f is not
periodic, define a functioning, such that
f — g is periodic.

Solution

Let x=0 $\Rightarrow$ cos 0 + tan 0 = 1+0 = 1. We solve equation

cos 2x + tan x=1; $\dfrac{1-\tan^2 x}{1+\tan^2 x}$ + tan x=1; 1-tan²x+ tan x+ tan³x= $1+\tan^2 x$;

tan x(tan²x-2tanx+1)=0 $\Rightarrow$ tan x =0, tan x=1

x=0 $\pm m\pi$, x=45⁰ $\pm m\pi$, m is integer.

So, the period of our function is π . Check it.

f (x+ π)= f (x)?

f (x+ π)=cos 2(x+ π) + tan(x+ π)= cos (2x+2 π)+ tan x= cos 2x + tan x =f (x).

Thus, the function f defined by f (x) = cos 2x + tan x is periodic. The period of the function is
π .

Answer:

The function f defined by f (x) = cos 2x + tan x is periodic.