# Answer on Question #79086 – Math – Calculus

## Question

Differentiate tan^-1{(sinx-cosx)/(sinx+cosx)} with respect to x/2.

## Solution

Let, a = $tan^{-1}[\frac{(\sin x-\cos x)}{(\sin x+\cos x)}]$

$= \tan^{-1}[\frac{(\tan x-1)}{(\tan x+1)}]$ [As, $\frac{(\sin x-\cos x)}{(\sin x+\cos x)} = \frac{\frac{(sin\,x-cos\,x)}{\cos x}}{\frac{(sin\,x+cos\,x)}{cos\,x}} = \frac{(\tan x-1)}{(\tan x+1)}$]

$= \tan^{-1}[\tan(x - \frac{\pi}{4})]$ [As, $\tan\frac{\pi}{4} = 1$ and $\tan(a-b) = \frac{(\tan a-\tan b)}{(\tan a.\tan b+1)}$]

$= (x - \frac{\pi}{4})$

Now differentiate a with respect to x we get, $\frac{da}{dx} = 1$

Again say, b = $\frac{x}{2}$

Now differentiate b with respect to x we get, $\frac{db}{dx} = \frac{1}{2}$

So, $\frac{da}{db} = \frac{\frac{da}{dx}}{\frac{db}{dx}} = \frac{1}{\frac{1}{2}} = 2.$

**Answer:** $\frac{da}{db} = 2.$