

Mat II		Ödev No		4						
Adı Soyadı:										
Öğrenci No:										
	0	0		0	5	0		0		
	1	1		1				1	1	
		2		2				2	2	
		3		3				3	3	
		4		4				4	4	
		5		5				5	5	
		6		6				6	6	
		7		7				7	7	
		8		8				8	8	
		9		9				9	9	

Sorular	Cevaplar
1) $\int \frac{1-\sin x}{1+\cos x} dx$	$\tan(x/2) - \ln(1 + \tan^2(x/2)) + C$
2) $\int \frac{2-\sin x}{1+2\cos x} dx$	
3) $\int \frac{\sin x + \cos^2 x}{4+2\tan x} dx$	

$$\tan(x/2)=t, \quad \tan(x)=\frac{2\tan(x/2)}{1-\tan^2(x/2)}=\frac{2t}{1-t^2},$$

$$\sin x = \frac{2\tan\frac{x}{2}}{1+\tan^2\frac{x}{2}} = \frac{2t}{1+t^2} \quad \cos x = \frac{1-\tan^2\frac{x}{2}}{1+\tan^2\frac{x}{2}} = \frac{1-t^2}{1+t^2}$$

$$\tan(x/2)=t, \quad x=\arctan 2t, \quad dx = \frac{2}{1+t^2} dt$$

$$I = \int \frac{1-\sin x}{1+\cos x} dx = \int \frac{1-\frac{2t}{1+t^2}}{1+\frac{1-t^2}{1+t^2}} \cdot \frac{2dt}{1+t^2} = \int \frac{\frac{1+t^2-2t}{1+t^2}}{\frac{1+t^2+1-t^2}{1+t^2}} \cdot \frac{2dt}{1+t^2}$$

$$= \int \frac{1+t^2-2t}{2} \cdot \frac{2dt}{1+t^2} = \int \frac{1+t^2-2t}{1+t^2} dt$$

$$= \int \frac{1+t^2}{1+t^2} dt - \int \frac{2t}{1+t^2} dt = \int 1 dt - \ln(1+t^2) = t - \ln(1+t^2)$$

$$I = t - \ln(1+t^2) = \tan(x/2) - \ln(1 + \tan^2(x/2))$$

Not: Kesirlerin integralinde paydanin derecesi kucukse (veya esitse) bolme yapilir. Ornek: $\int \frac{3t^2+2}{1+t^2} dt = ?$

$$\begin{array}{r} 3t^2+2 \\ - \quad 3t^2+3 \\ \hline -1 \end{array} \quad \left| \begin{array}{l} t^2+1 \\ 3 \end{array} \right.$$

$$\int \frac{3t^2+2}{1+t^2} dt = \int \left(3 + \frac{-1}{1+t^2} \right) dt = \int 3dt - \int \frac{1}{1+t^2} dt$$

$$= 3t + \arctan t$$