

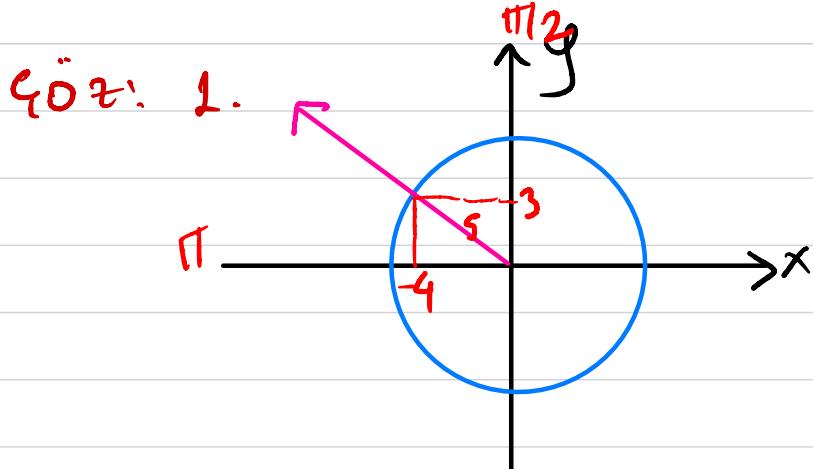
MA121 2. Hafta Uygulama

1-3 alıştırmalarında $\sin x$, $\cos x$ ve $\tan x$ 'ten biri verilmiştir. x belirtilen aralıktaysa, diğer ikisini bulunuz.

$$1. \sin x = \frac{3}{5}, \quad x \in \left[\frac{\pi}{2}, \pi \right]$$

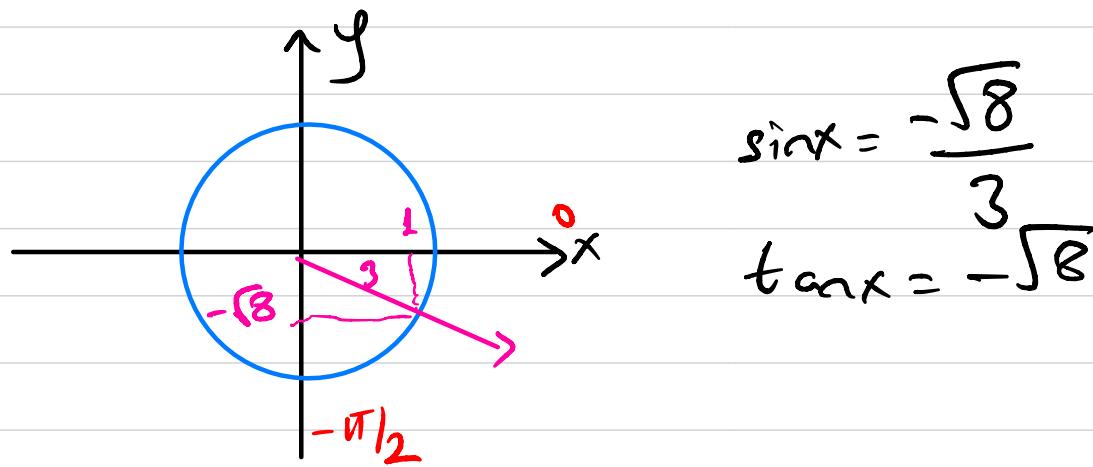
$$2. \cos x = \frac{1}{3}, \quad x \in \left[-\frac{\pi}{2}, 0 \right]$$

$$3. \tan x = \frac{1}{2}, \quad x \in \left[\pi, \frac{3\pi}{2} \right]$$



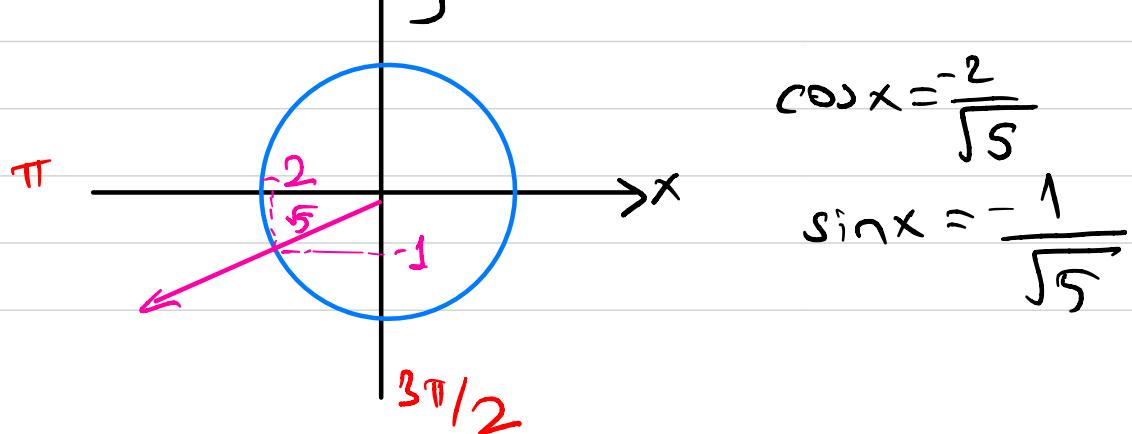
$$\cos x = -\frac{4}{5}$$

$$\tan x = -\frac{3}{4}$$



$$\sin x = -\frac{\sqrt{8}}{3}$$

$$\tan x = -\sqrt{8}$$



$$\cos x = \frac{2}{\sqrt{5}}$$

$$\sin x = -\frac{1}{\sqrt{5}}$$

4-7 alıştırmalarındaki fonksiyonları çizin. Her fonksiyonun periyodu nedir?

$$4. \sin 2x$$

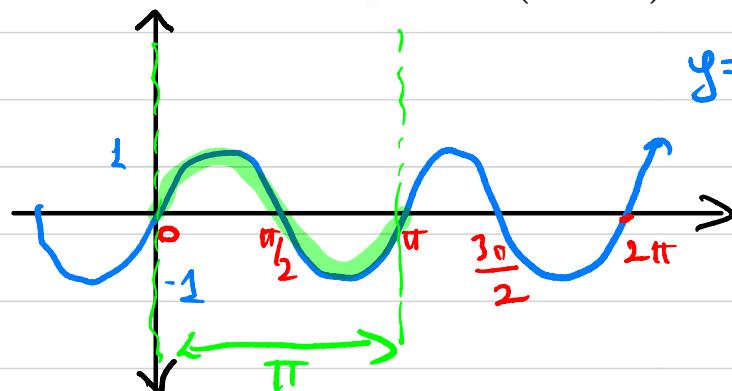
4. $\sin 2x$

$$5. \cos \pi x$$

$$6. \cos\left(x - \frac{\pi}{2}\right)$$

$$7. \sin\left(x - \frac{\pi}{4}\right) + 1$$

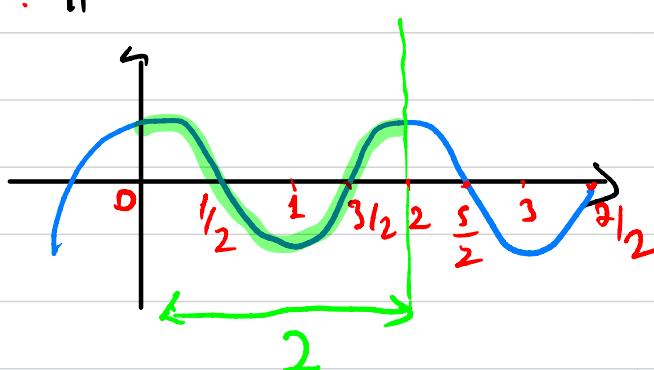
$$7. \sin\left(x - \frac{\pi}{4}\right) + 1$$



$$y = \sin 2x$$

Period : π

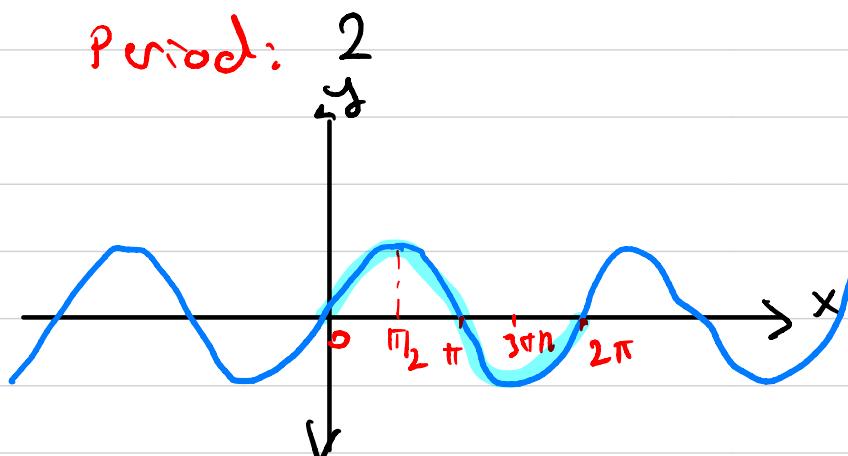
$$5.$$



$$y = \cos(\pi x)$$

Period: $\frac{2}{\pi}$

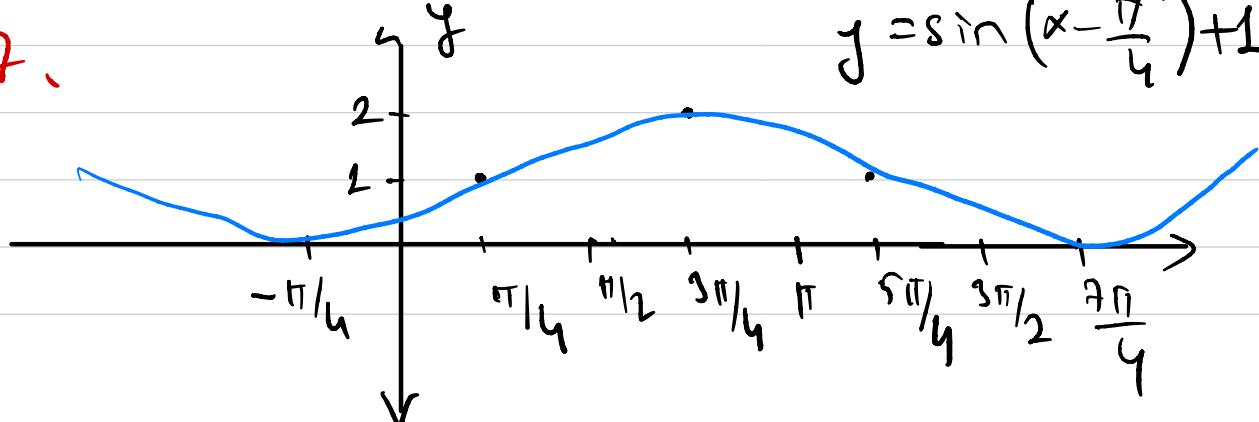
$$6.$$



Period: 2π

$$7.$$

$$y = \sin\left(x - \frac{\pi}{4}\right) + 1$$

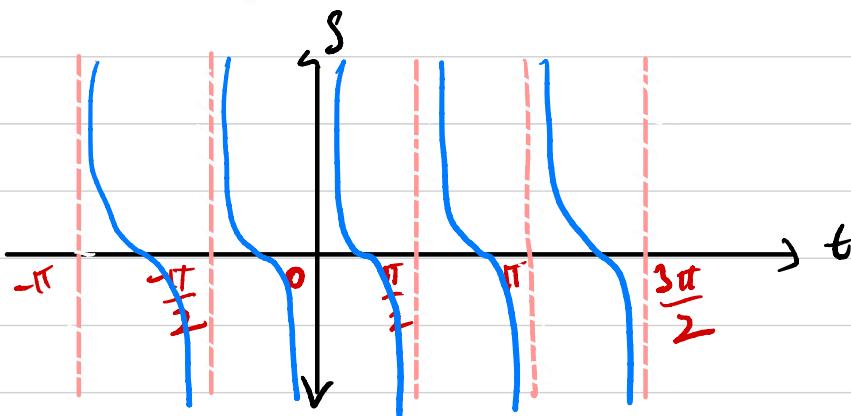


8 - 9 alıştırmalarındaki fonksiyonları ts -düzleminde (t yatay, s dikey eksen) çizin. Her fonksiyonun periyodu nedir? Grafiklerin simetrileri nelerdir?

$$8. \ s = \cot 2t$$

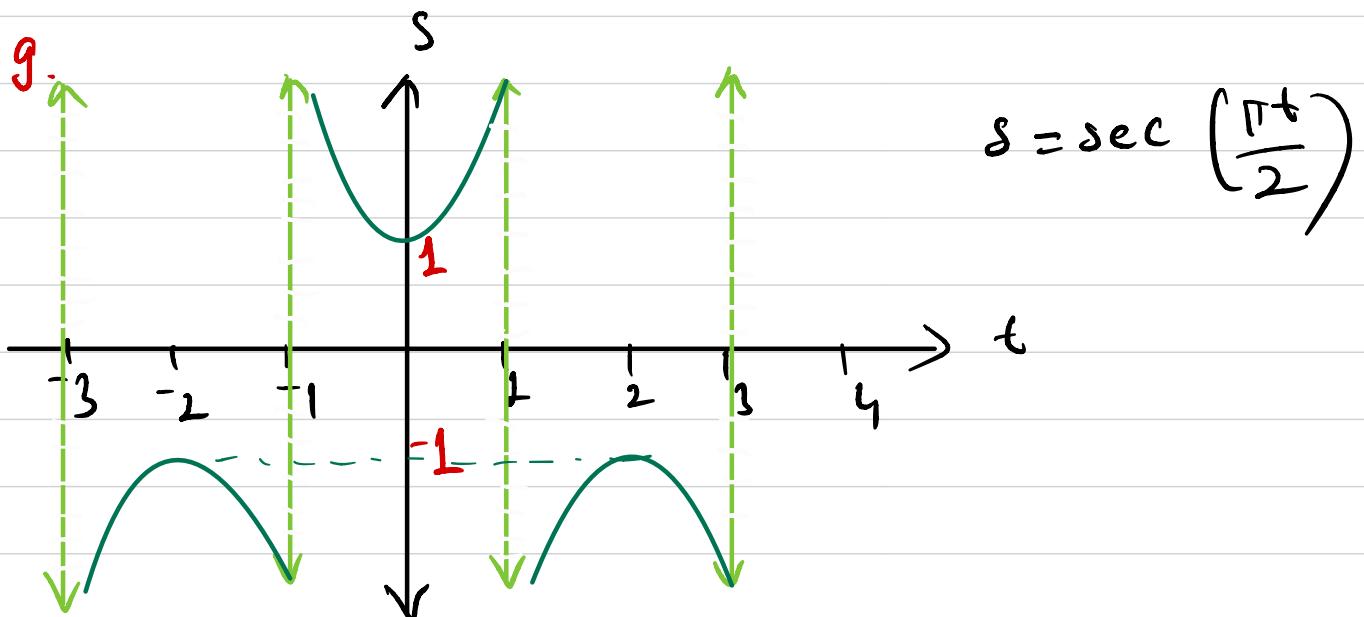
$$9. \ s = \sec\left(\frac{\pi t}{2}\right)$$

407: 8.



$$s = \cot 2t$$

$$\cot 2t = \frac{\cos 2t}{\sin 2t} = 0 \Rightarrow 2t = (2k+1)\pi/2 \Rightarrow t = (2k+1)\pi/4$$



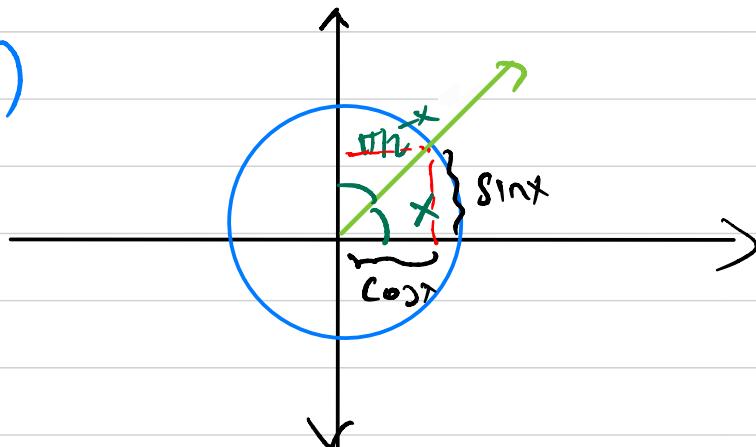
$$\sec\left(\frac{\pi t}{2}\right) = \frac{1}{\cos\left(\frac{\pi t}{2}\right)}$$

10. Aşağıdaki bağıntıları ispatlayınız.

Cöz: a) $\cos\left(x - \frac{\pi}{2}\right) = \sin x$ $\sin\left(x - \frac{\pi}{2}\right) = -\cos x$

c) $\sin\left(x + \frac{\pi}{2}\right) = \cos x$ $\cos\left(x + \frac{\pi}{2}\right) = -\sin x$

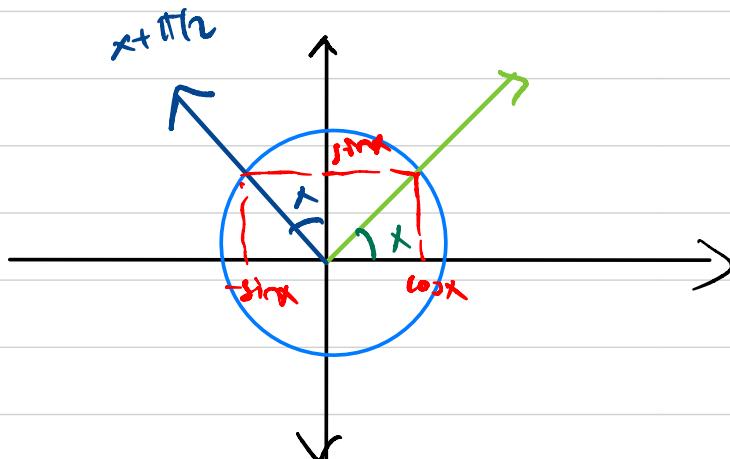
Cöz: a)



$$\cos\left(x - \frac{\pi}{2}\right) = \cos\left(\frac{\pi}{2} - x\right) = \sin x$$

$$\sin\left(x - \frac{\pi}{2}\right) = -\sin\left(\frac{\pi}{2} - x\right) = -\cos x$$

b)



$$\cos\left(x + \frac{\pi}{2}\right) = -\sin x$$

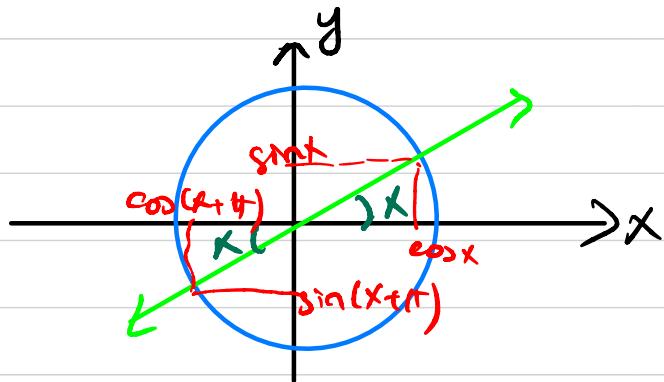
c) $\sin\left(x + \frac{\pi}{2}\right) = \cos x$

11-12 alıştırmalarında, verilen büyüklüğü $\sin x$ ve $\cos x$ cinsinden ifade edin.

$$11. \cos(\pi + x)$$

$$12. \sin\left(\frac{3\pi}{2} - x\right)$$

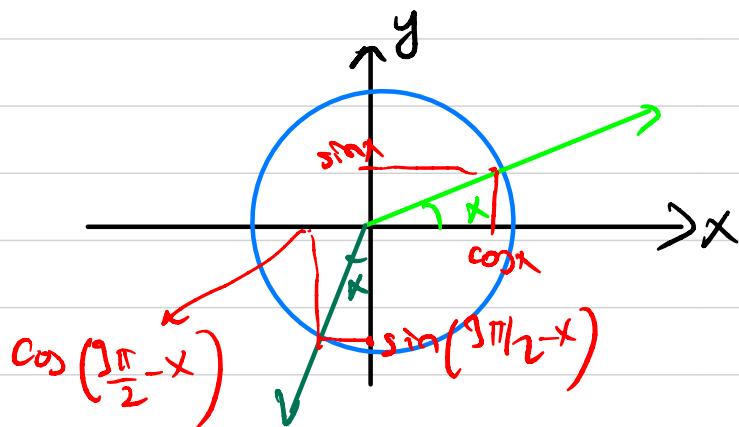
côz: 11.



$$\cos(x + \pi) = -\cos x$$

$$\sin(x + \pi) = -\sin x$$

12.



$$\sin\left(\frac{3\pi}{2} - x\right) = -\cos x$$

$$\cos\left(\frac{3\pi}{2} - x\right) = -\sin x$$

13. $\sin \frac{7\pi}{12}$, nin değerini $\sin\left(\frac{\pi}{4} + \frac{\pi}{3}\right)$ 'ü hesaplayarak bulun.

Cöz: $\sin\left(\frac{7\pi}{12}\right) = \sin\left(\frac{\pi}{4} + \frac{\pi}{3}\right)$

$$= \sin \frac{\pi}{4} \cdot \cos \frac{\pi}{3} + \cos \frac{\pi}{4} \sin \frac{\pi}{3}$$

$$= \frac{\sqrt{2}}{2} \cdot \frac{1}{2} + \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} = \frac{\sqrt{6} + \sqrt{2}}{4}$$

14-15 alıştırmalarındaki fonksiyonların değerlerini bulun.

14. $\cos^2 \frac{\pi}{8}$

15. $\sin^2 \frac{\pi}{12}$

Cöz: 14. $\cos^2 \theta = \frac{1 + \cos 2\theta}{2}$

$$\Rightarrow \cos^2 \frac{\pi}{8} = \frac{1 + \cos \frac{\pi}{4}}{2} = \frac{1 + \sqrt{2}/2}{2} = \frac{2 + \sqrt{2}}{4}$$

15. $\sin^2 \frac{\pi}{12} = \frac{1 - \cos \frac{\pi}{6}}{2} = \frac{1 - \sqrt{3}/2}{2} = \frac{2 - \sqrt{3}}{4}$

16. Tanjant toplama formülü İki açının toplamının tanjantının standart toplamı

$$\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

olarak verilir. Formülü çıkartın.

İspat: $\tan(A+B) = \frac{\sin(A+B)}{\cos(A+B)}$

$$= \frac{\sin A \cos B + \cos A \sin B}{\cos A \cos B - \sin A \sin B}$$

Pay ve paydayı $\cos A \cos B$ 'ye bölelim.

$$= \frac{\frac{\sin A \cos B}{\cos A \cos B} + \frac{\cos A \sin B}{\cos A \cos B}}{\frac{\cos A \cos B}{\cos A \cos B} - \frac{\sin A \sin B}{\cos A \cos B}} = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

Üstel Fonksiyonlar ile ilgili Kurallar

Eğer $a > 0$ ve $b > 0$ olacak şekilde aşağıdaki özellikler tüm x ve y reel sayıları için geçerlidir.

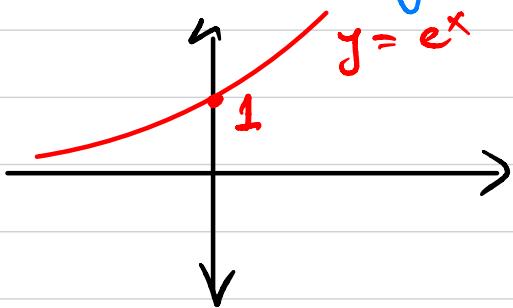
$$1. \ a^x \cdot a^y = a^{x+y}$$

$$2. \ \frac{a^x}{a^y} = a^{x-y}$$

$$3. \ (a^x)^y = (a^y)^x = a^{xy} \quad 4. \ a^x b^x = (ab)^x$$

$$5. \ \frac{a^x}{b^x} = \left(\frac{a}{b}\right)^x$$

Dögal Üstel Fonksiyon: e^x



Soru: Aşağıdaki üstel fonksiyonların grafiklerini aynı koordinat düzleminde çiziniz.

a) $y = 2^{-t}$ ve $y = -2^t$

b) $y = c^x$ ve $y = \frac{1}{e^x} = e^{-x}$

