


$e$

# Trigonometriya Asoslari: 1-sinf, cos, tan ishoralari

Ushbu taqdimot trigonometriya o'qituvchilari uchun mo'ljallangan. Unda asosiy tushunchalar, ishoralar va o'quv jarayonida qo'llaniladigan usullar ko'rib chiqiladi. Mavzular sodda va tushunarli tilda bayon etiladi.

 by Python Jobs

# Trigonometrik Funktsiyalarning Ta'rifi

## Asosiy Funktsiyalar

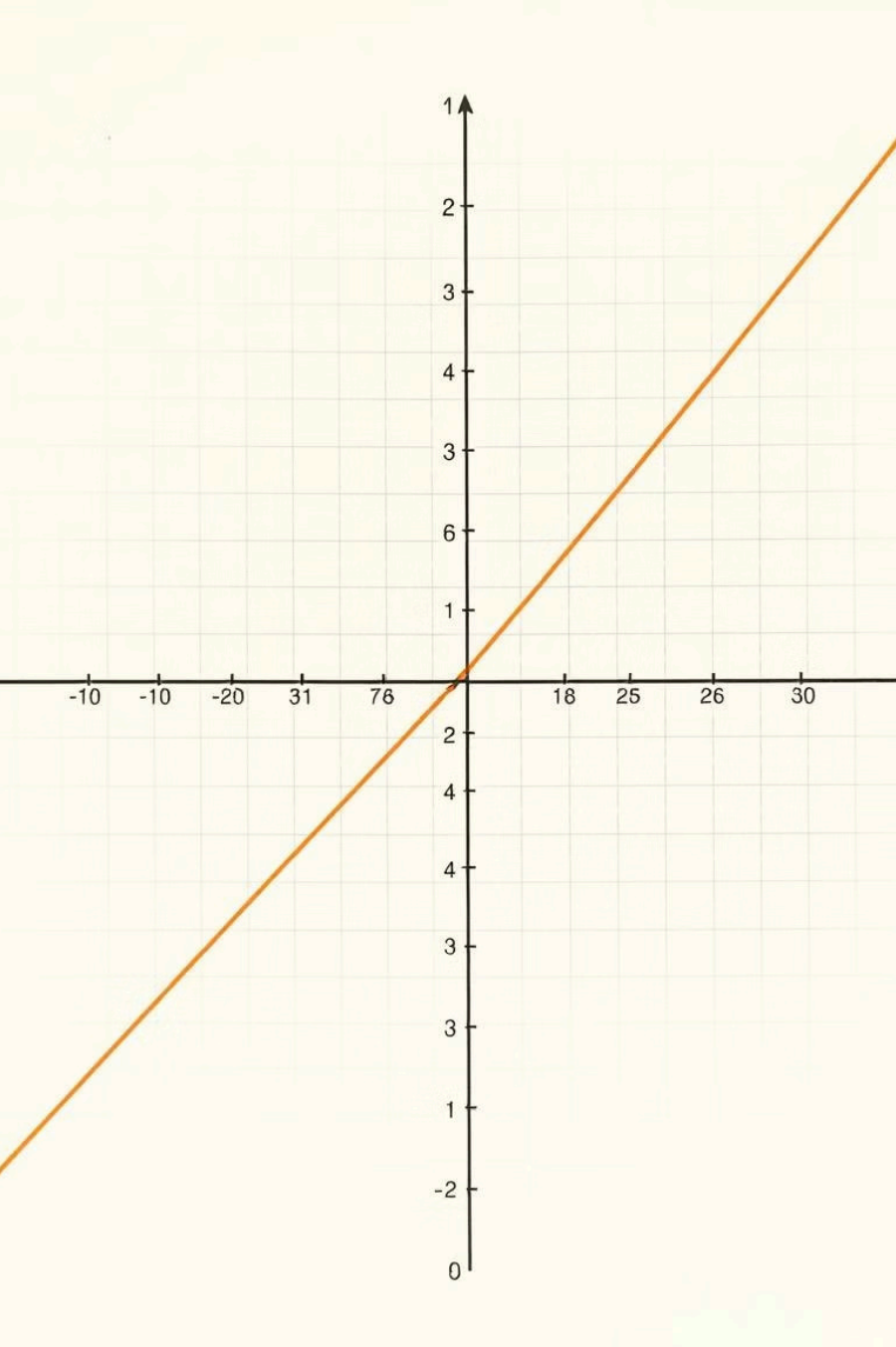
Sinus ( $\sin$ ), kosinus ( $\cos$ ), tangens ( $\tan$ ) va kotangens ( $\cot$ ) trigonometriyaning asosiy funktsiyalari hisoblanadi.

## Birlik Aylana

Birlik aylana koordinatalari trigonometrik funktsiyalarni aniqlashda muhim rol o'ynaydi.

## Aniqanish Sohasi

Har bir trigonometrik funktsiyaning aniqlanish sohasi mavjud. Buni bilish tenglamalarni yechishda muhim.



# Choraklar bo'yicha Ishoralar

Chorak	Sinus (sin)	Kosinus (cos)	Tangens (tan)
I	+	+	+
II	+	-	-
III	-	-	+
IV	-	+	-

# Trigonometrik Funksiyalarning Juft va Toqligi

## 1 Juft Funksiya

Kosinus ( $\cos$ ) - juft  
funksiya:  $\cos(-a) = \cos(a)$ .  
Grafiki y o'qiga nisbatan  
simmetrik.

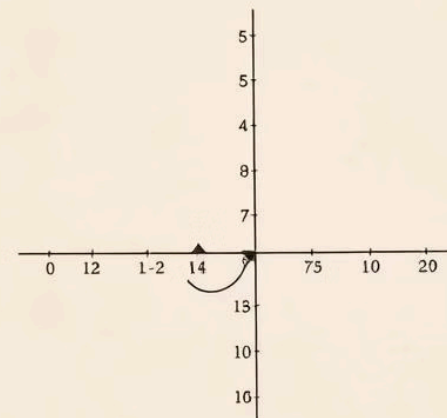
## 3 Simmetriya

Toq funksiyalar koordinata boshiga nisbatan simmetrik.  
Grafiklarning simmetriyasiga e'tibor bering.

## 2 Toq Funksiyalar

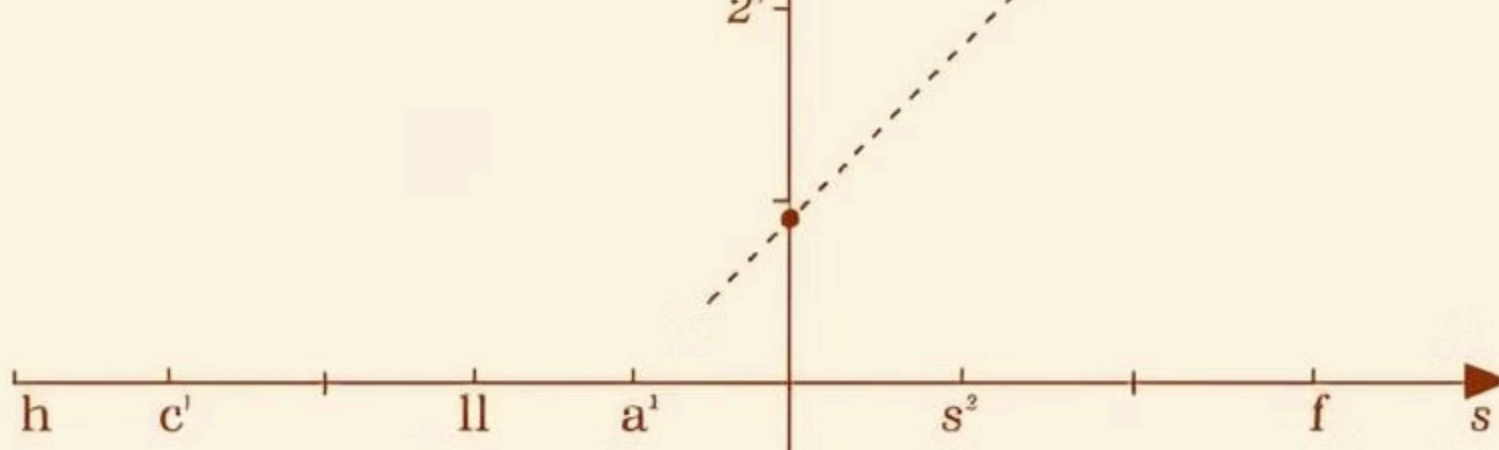
Sinus ( $\sin$ ), tangens ( $\tan$ )  
va kotangens ( $\text{ctg}$ ) - toq  
funksiyalar.  $\sin(-a) = -\sin(a)$

Cocossine function



Since

$$\begin{aligned} & -1 - (1-1) + 2y((-1-)) \\ & = 2(x21^{\circ}) \left( = \frac{1-}{y} \right) \end{aligned}$$



# a va -a Burchaklarning Trigonometrik Funktsiyalari



$$\sin(-a) = -\sin(a)$$



$$\cos(-a) = \cos(a)$$



$$\tan(-a) = -\tan(a)$$



$$\operatorname{ctg}(-a) = -\operatorname{ctg}(a)$$

# Asosiy Trigonometrik Ayniyatlar

1

## Pifagor Ayniyati

$$\sin^2(a) + \cos^2(a) = 1$$

2

## Tangens

$$\tan(a) = \sin(a) / \cos(a)$$

3

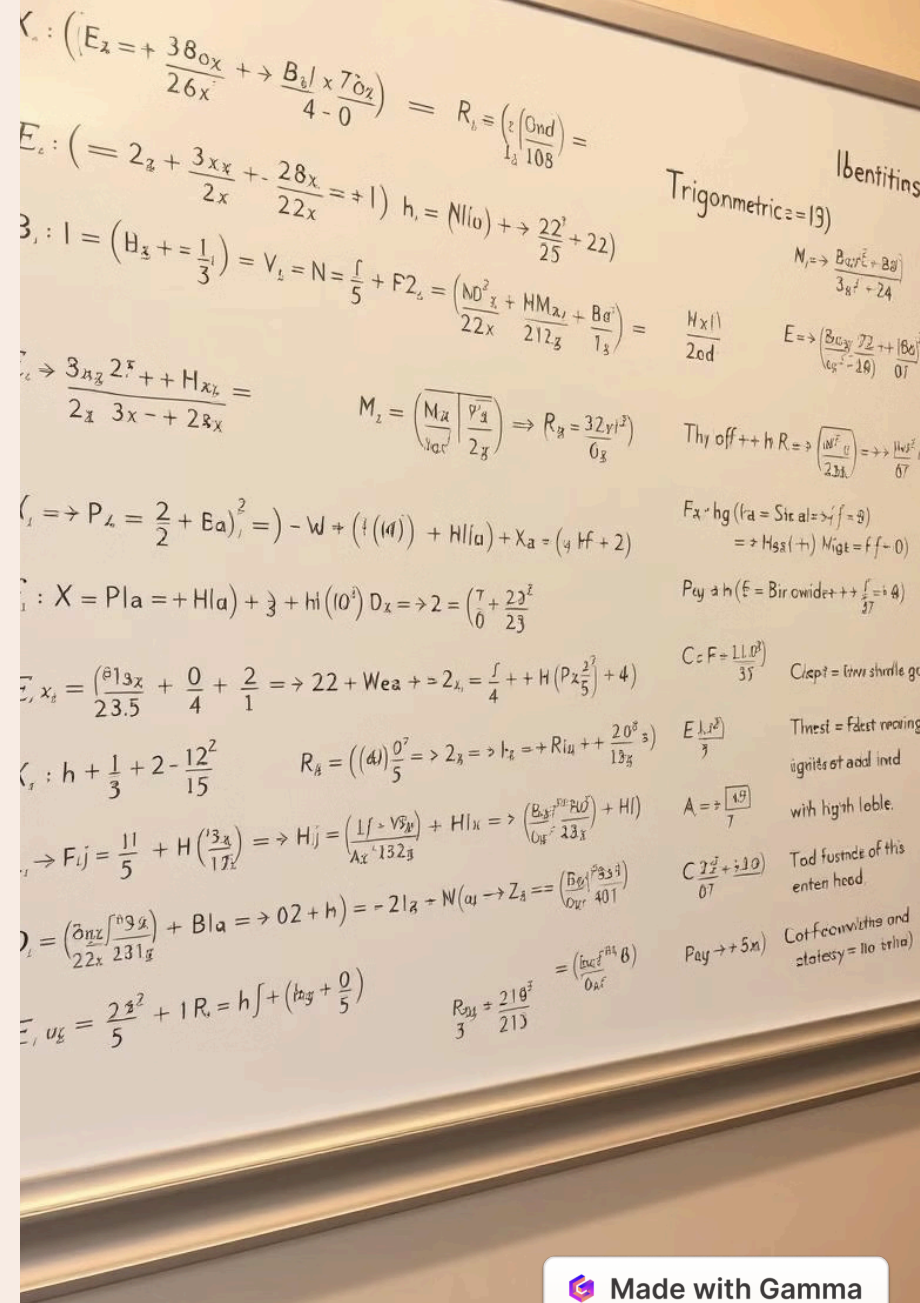
## Kotangens

$$\cotg(a) = \cos(a) / \sin(a)$$

4

## O'zaro Bog'liqlik

$$\tan(a) * \cotg(a) = 1$$



# Qo'shimcha Trigonometrik Ayniyatlar

## Ikki Karra Burchak

$$\sin(2a) = 2\sin(a)\cos(a)$$

## Kosinus

$$\cos(2a) = \cos^2(a) - \sin^2(a)$$

## Tangens

$$\tan(2a) = 2\tan(a) / (1 - \tan^2(a))$$

## Advanced Trigonometric - Double Angles

$$\begin{aligned} \frac{e}{f+x} &= \frac{2}{13} & 2x &= \frac{(3+10)}{5} & \frac{1}{x+h} &= \frac{1}{+3} & 2x &= 3+7+10 \end{aligned}$$

$$x'e = 3 + 5 = \dots = 4x + (7+0)$$

$$x'f = 2 = (63) = \dots = 2 + 52 + 9$$

$$x' = +2 = +3 = \dots = \frac{17+43+17}{10+50}$$

$$x'f + 2 + 83 = \dots = 10 + 50$$

$$x'f + 3 = +9 = \dots = \frac{10+2}{(4+3)}$$

$$x'f + 49 + 44 = \dots = \frac{2}{e} = (2.6)$$

$$x'f + 3 = (60) = \dots = +82 + h$$

$$x'f + 3 + 4 = \dots = f + 02 - 13$$

$$x' = +2 = 42 = \dots = 4x + 45:60$$

$$x' = +3 + 32 = \dots = +48 + 3$$

$$x'f + 4 = 63 = \dots = +42 + 10$$

$$x'f = 4$$

$$2x' = ++7 = 2+10$$

$$f_x = (may) = 2x + 16 +$$

$$1x = (hmay) = 2 = 32 + 0$$

$$+x: Airgag = +2 = 4 - +5$$

$$+x: bobleg = 4 + f - 6.9$$

# Yig'indi va Ayirmalarning Trigonometrik Funktsiyalari

1

## Sinus

$$\sin(a \pm b) = \sin(a)\cos(b) \pm \cos(a)\sin(b)$$

2

## Kosinus

$$\cos(a \pm b) = \cos(a)\cos(b) \mp \sin(a)\sin(b)$$

3

## Tangens

$$\tan(a \pm b) = (\tan(a) \pm \tan(b)) / (1 \mp \tan(a)\tan(b))$$

## Trigonometric Identities

Trigonometric identities:

$$\sin(a \pm b) = \sin(a)\cos(b) \pm \cos(a)\sin(b)$$

$$\cos(a \pm b) = \cos(a)\cos(b) \mp \sin(a)\sin(b)$$

$$\tan(a \pm b) = (\tan(a) \pm \tan(b)) / (1 \mp \tan(a)\tan(b))$$

$$\sin(2a) = 2\sin(a)\cos(a)$$

$$\cos(2a) = \cos^2(a) - \sin^2(a)$$

$$\tan(2a) = \frac{2\tan(a)}{1 - \tan^2(a)}$$

$$\sin^2(a) + \cos^2(a) = 1$$

L. difference:

$$\sin(a \pm b) = \sin(a)\cos(b) \pm \cos(a)\sin(b)$$

$$\cos(a \pm b) = \cos(a)\cos(b) \mp \sin(a)\sin(b)$$

$$\tan(a \pm b) = (\tan(a) \pm \tan(b)) / (1 \mp \tan(a)\tan(b))$$

$$\sin(2a) = 2\sin(a)\cos(a)$$

$$\cos(2a) = \cos^2(a) - \sin^2(a)$$

$$\tan(2a) = \frac{2\tan(a)}{1 - \tan^2(a)}$$

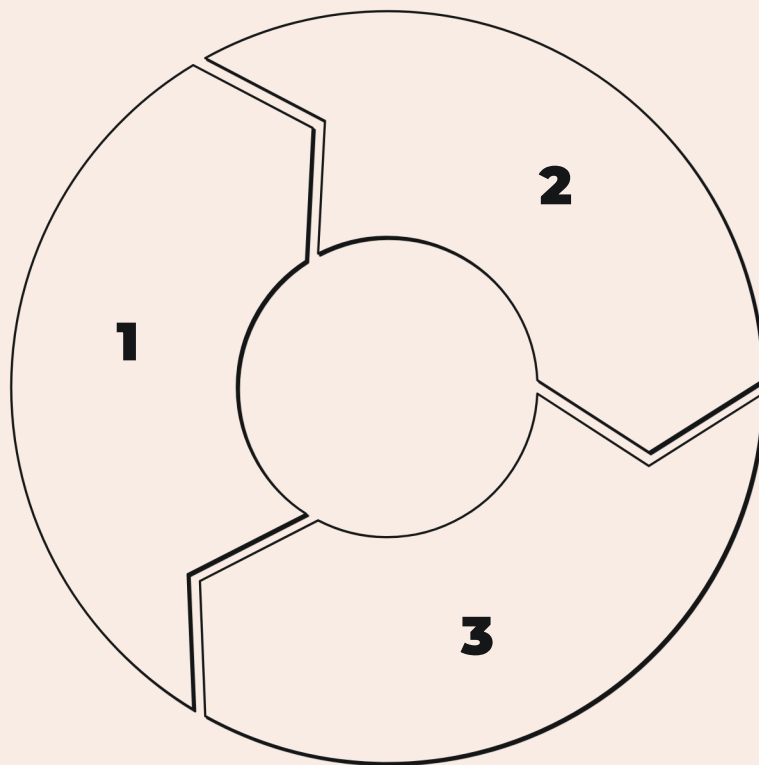
$$\sin^2(a) + \cos^2(a) = 1$$



# Trigonometrik Tenglamalarni Yechish

## Oddiy Tenglamalar

$$\sin(x) = a, \cos(x) = a$$



## Tangens

$$\tan(x) = a$$

## Umumiy Yechimlar

Xususiy yechimlar

# Xulosa

Ushbu taqdimotda trigonometrik funksiyalar va ayniyatlarning asosiy tushunchalari ko'rib chiqildi. Olingan bilimlarni amaliyotda qo'llash va kelgusi mavzularga tayyorgarlik ko'rish muhim. E'tiboringiz uchun rahmat!