UDAAN

2025

Trigonometry

Mathematics | Lecture - 01

By – Ritik Sir

Topics *to be covered*

1. Basics
2. Why do we study trigonometry?
3. Trigonometric Ratios

संवाद

DPP + Video Solution ?

News 2

A) ubto the mark (45%)

B) nahi hai, better. (32%)

C) Bhut Bekaar hai, samajh nahi aaya.

D) Bye.

Doubt puchte ho..... Uska answer ka notification aata hai?

Yes

Main bhi apka doubt solve karunga.

Revision 9

+ PYQs

Date → tomorrow

Time → 6:30 / 7:00

Jagah → udaan yT channel.

live

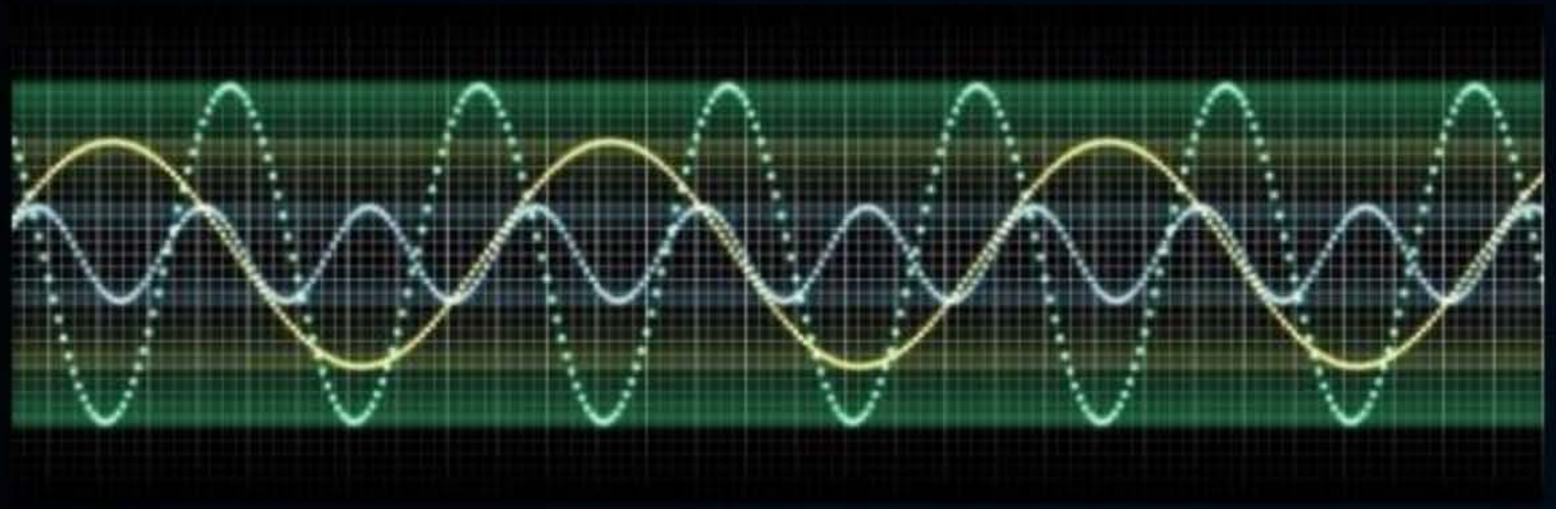
Deleted position (not for CBSE).

→ last year key recorded lectures.

last year 2024

A) chalega
B) dodega
C) - - .
D) - - —


WORK HARD
DREAM BIG
NEVER GIVE UP !!
Janam kabh lena hai or Marna kabh hai vo hum decide nhi kr skte, pr kese jeena hai vo hum decide kr skte hain.

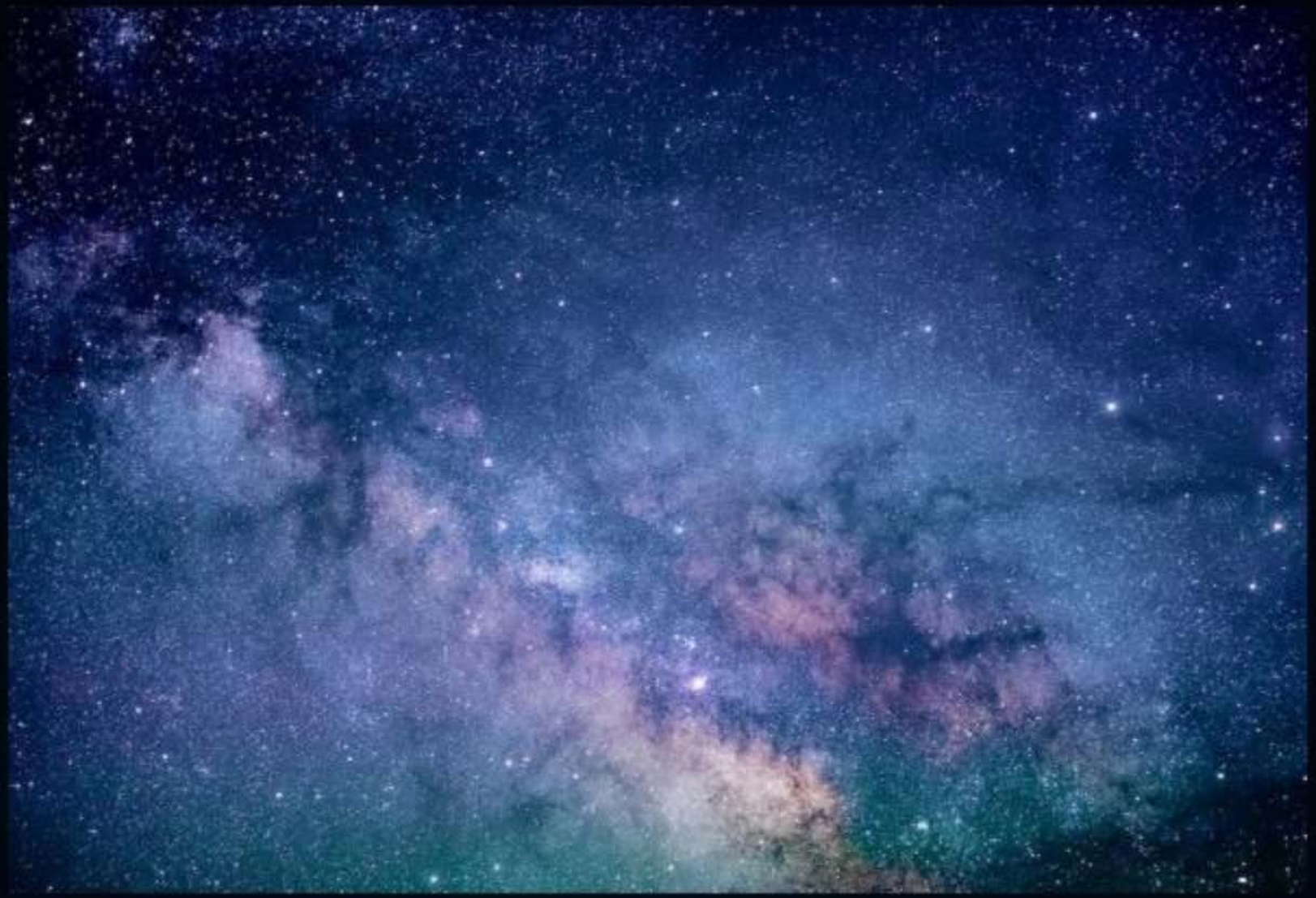


Trigonometry in Music

Trigonometry in Video Games

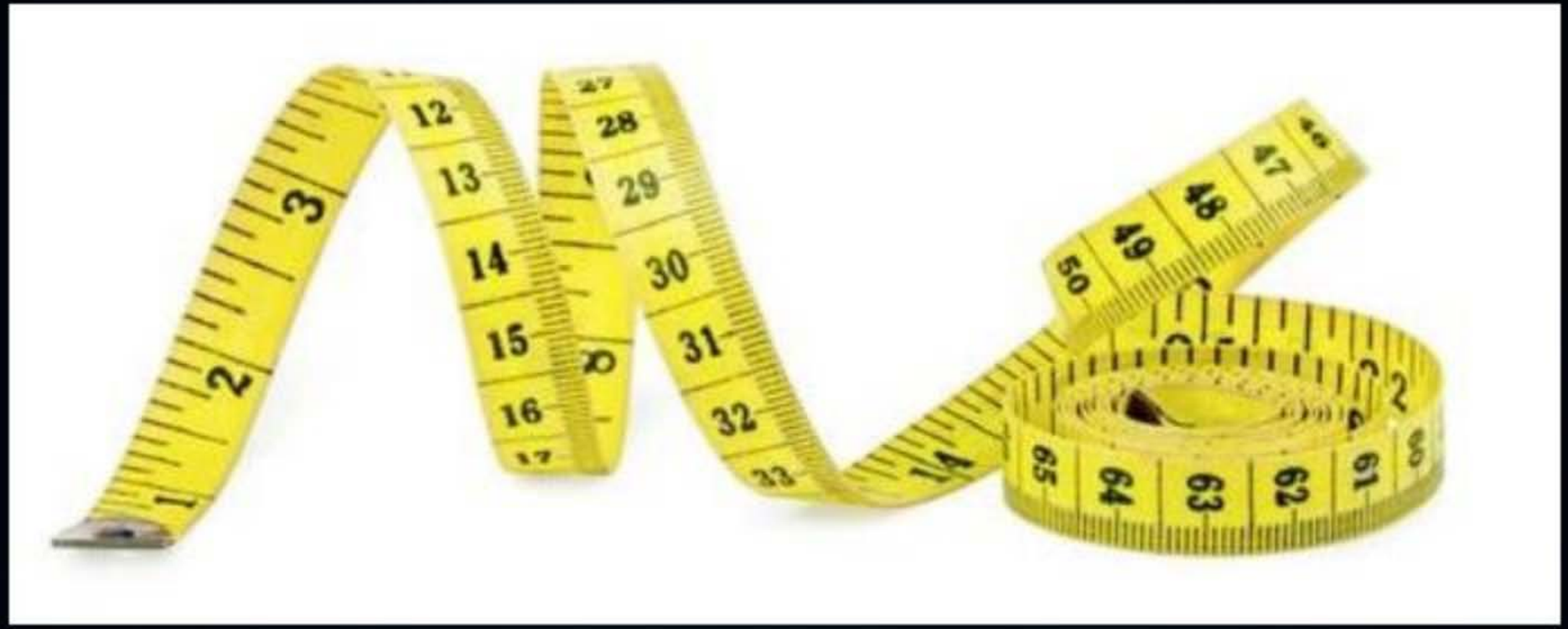
Trigonometry in Criminology

Trigonometry in Navigation



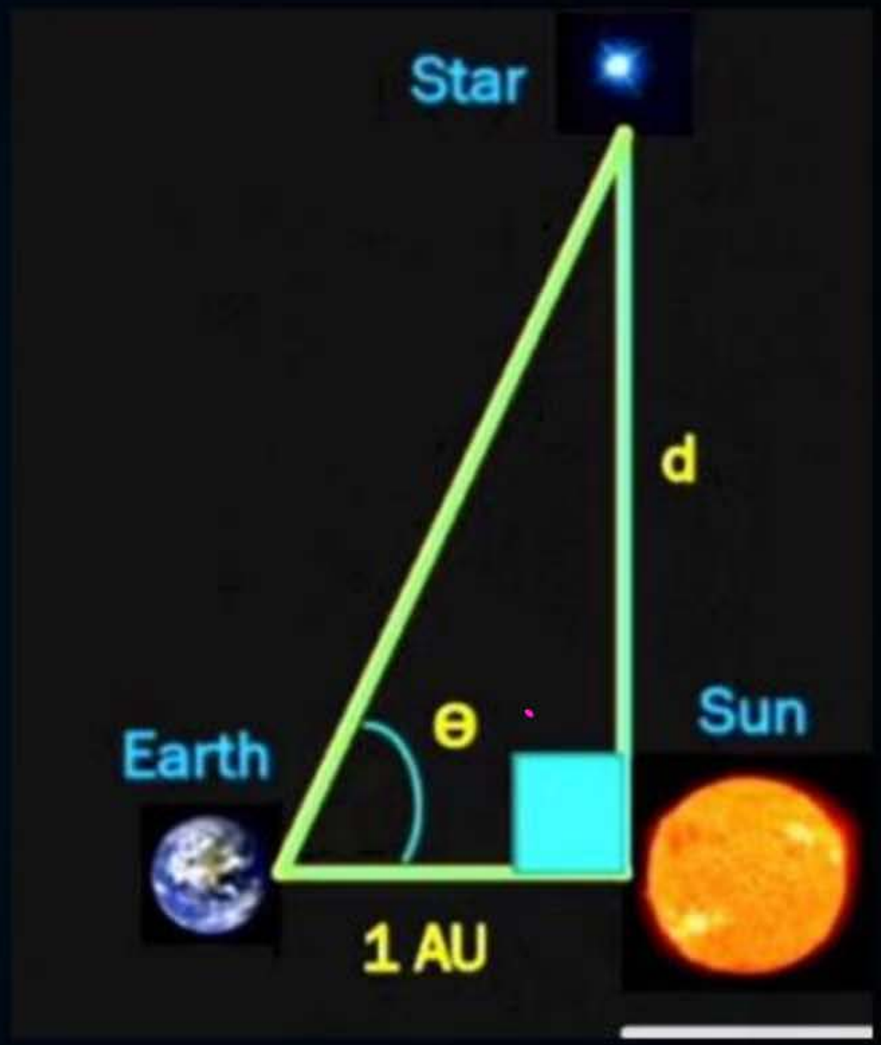
Trigonometry in Astronomy

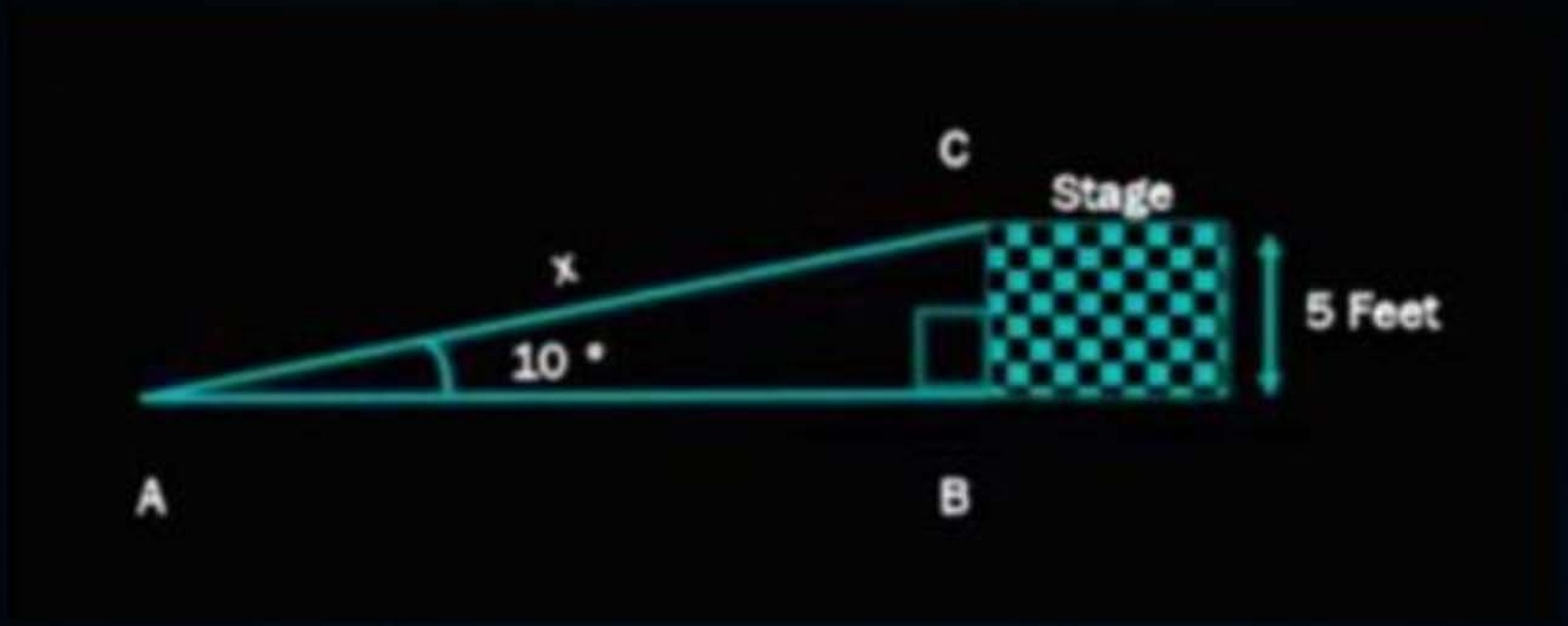
Trigonometry in Construction



To Measure Height of Objects


A
θ
θ
C
B

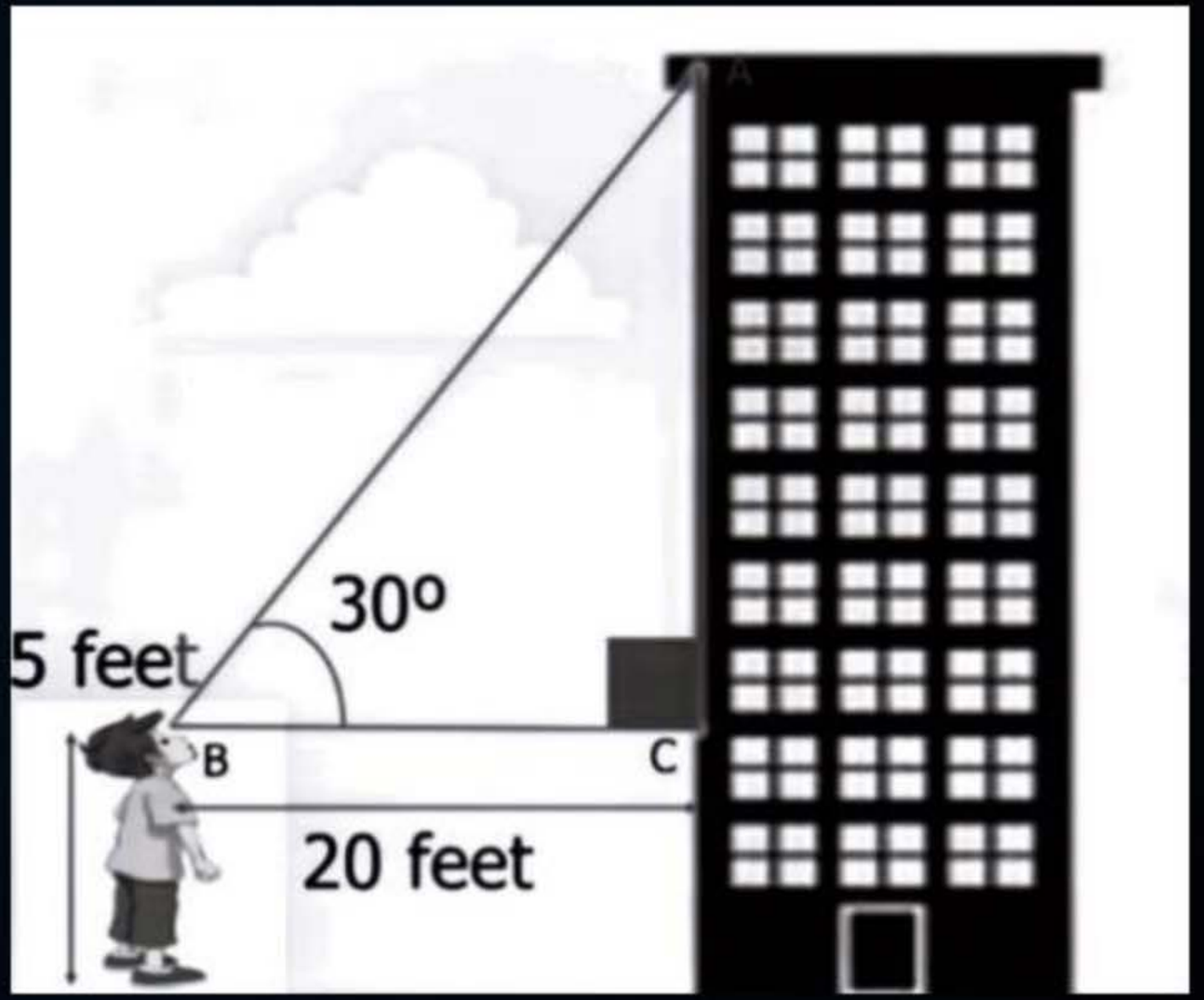

Star
d
Earth
θ
Sun
1 AU



Wheel Chair Ramps

Instruments used to measure the angles of elevation and depression

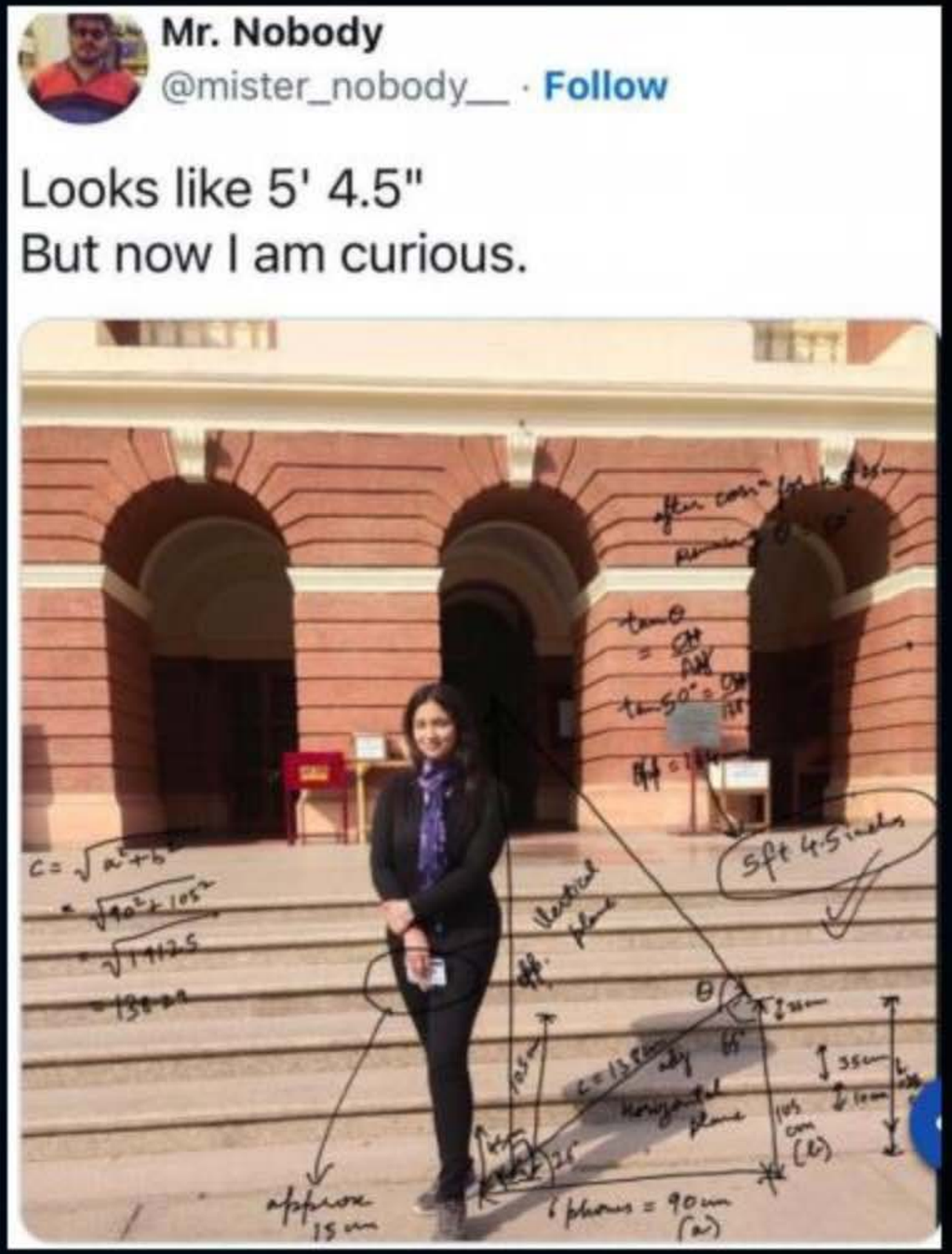
- Clinometer/Inclinometer
- Theodolite
- Goniometer


A
30°
5 feet
B
C
20 feet

Monuments

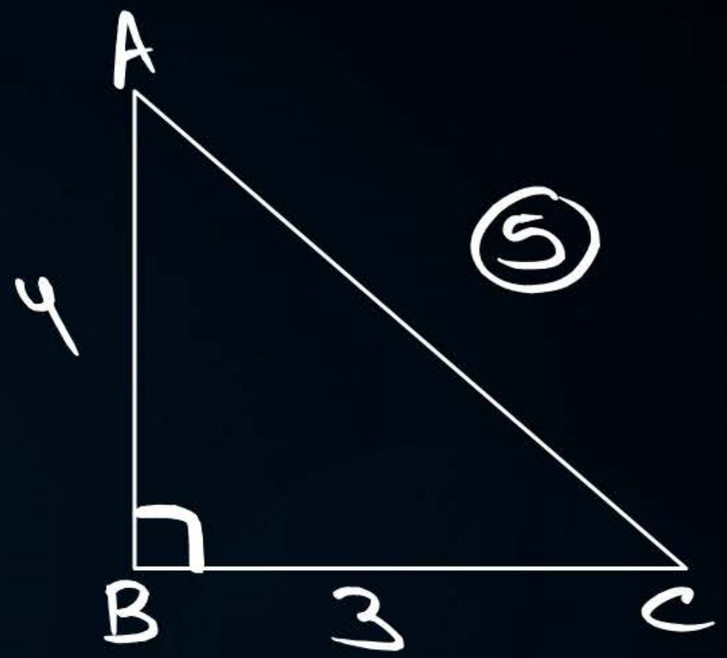
Mountains


Pallavi Pandey · Feb 27, 2023
@pallavipandeyy · Follow
guess my height!


Mr. Nobody
@mister_nobody__ · Follow
Looks like 5' 4.5"
But now I am curious.
5ft 4.5inches

Pythagoreas theorem:

$$H^2 = P^2 + B^2$$

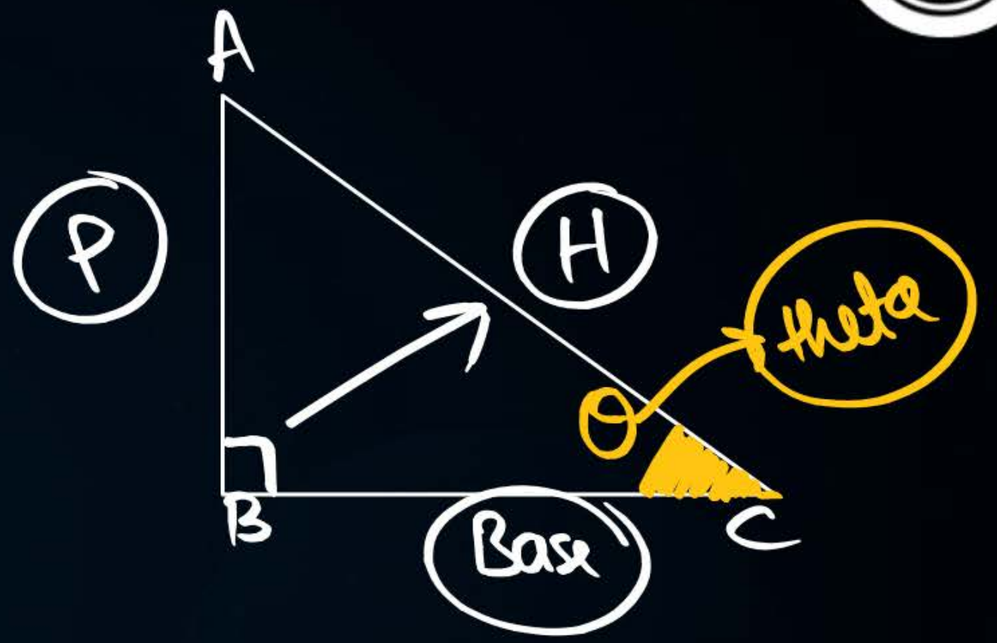


Trigonometry

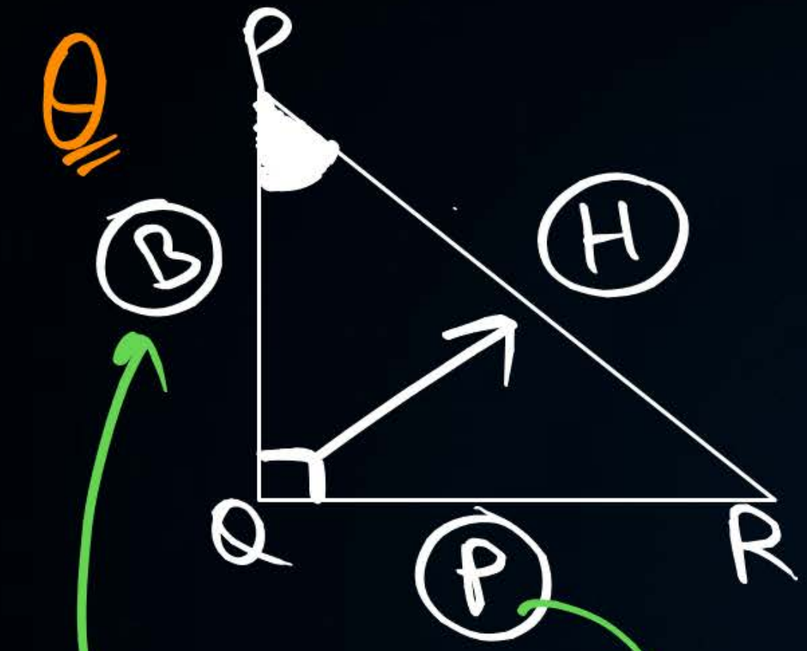
3 sides polygon

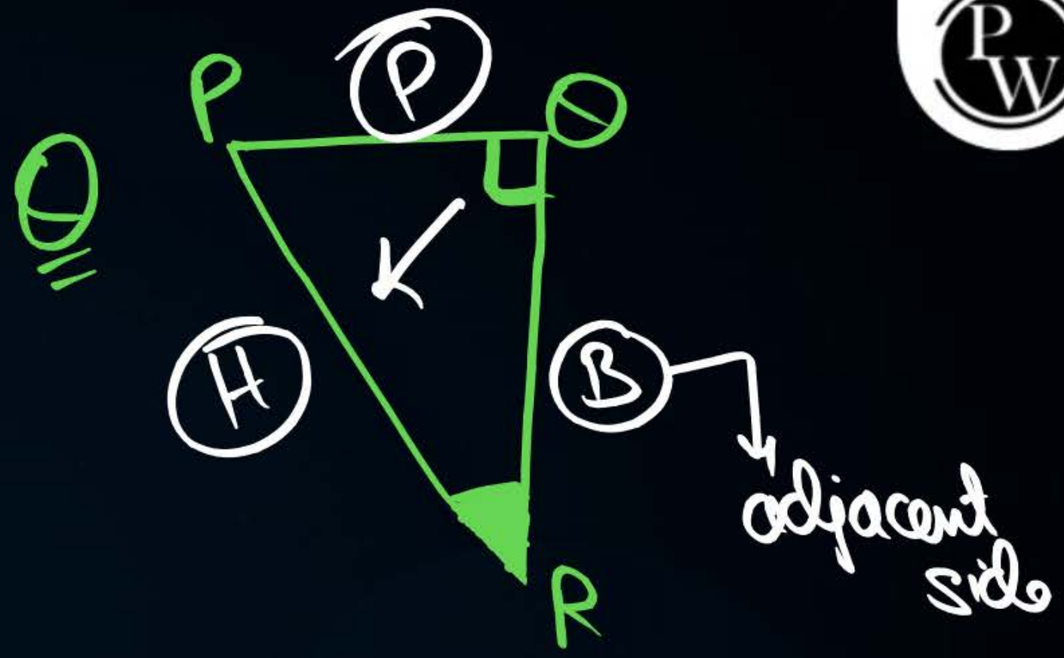
measurement.

triangle



- α = alpha θ = theta.
- β = Beta
- γ = gama


θ
P
B
H
Q
P
R
adjacent side.
opposite side.


θ
P
P
Q
K
H
B
R
adjacent side

Trigonometric Ratios

$\text{Sine}\theta = \frac{P}{H}$ $(\sin\theta)$

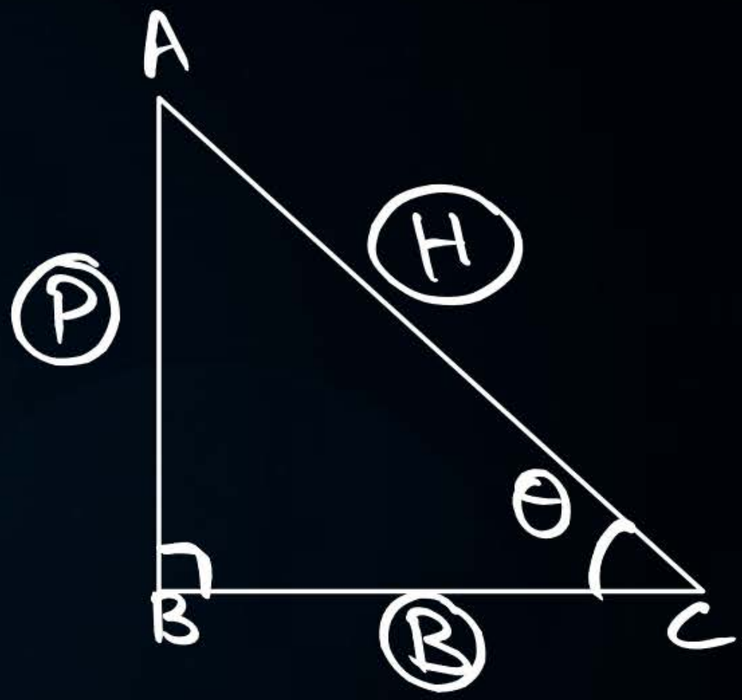
$\text{Cosine}\theta = \frac{B}{H}$ $(\cos\theta)$

$\text{Tangent}\theta = \frac{P}{B}$ $(\tan\theta)$

$\text{Cosecant}\theta = \frac{H}{P}$ $(\text{cosec}\theta)$

$\text{Secant}\theta = \frac{H}{B}$ $(\sec\theta)$

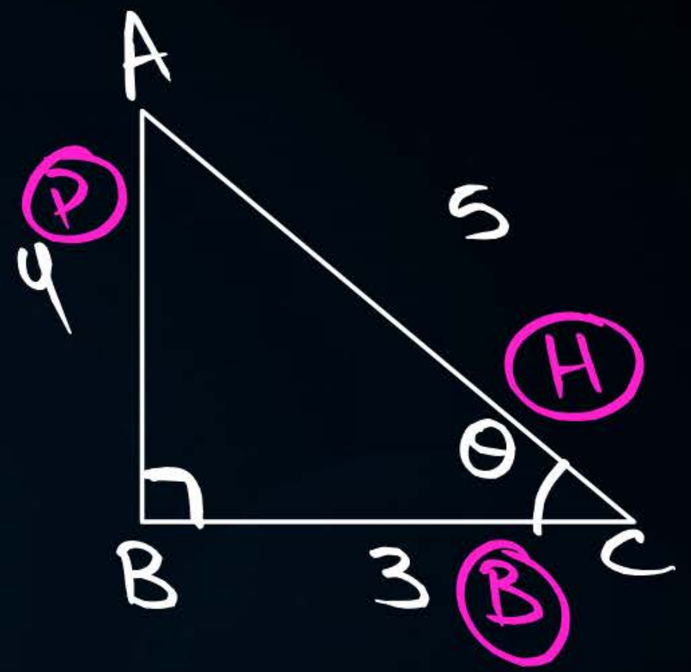
$\text{Cotangent}\theta = \frac{B}{P}$ $(\cot\theta)$



① $\sin\theta = \frac{P}{H} = \frac{4}{5}$

② $\tan\theta = \frac{P}{B} = \frac{4}{3}$

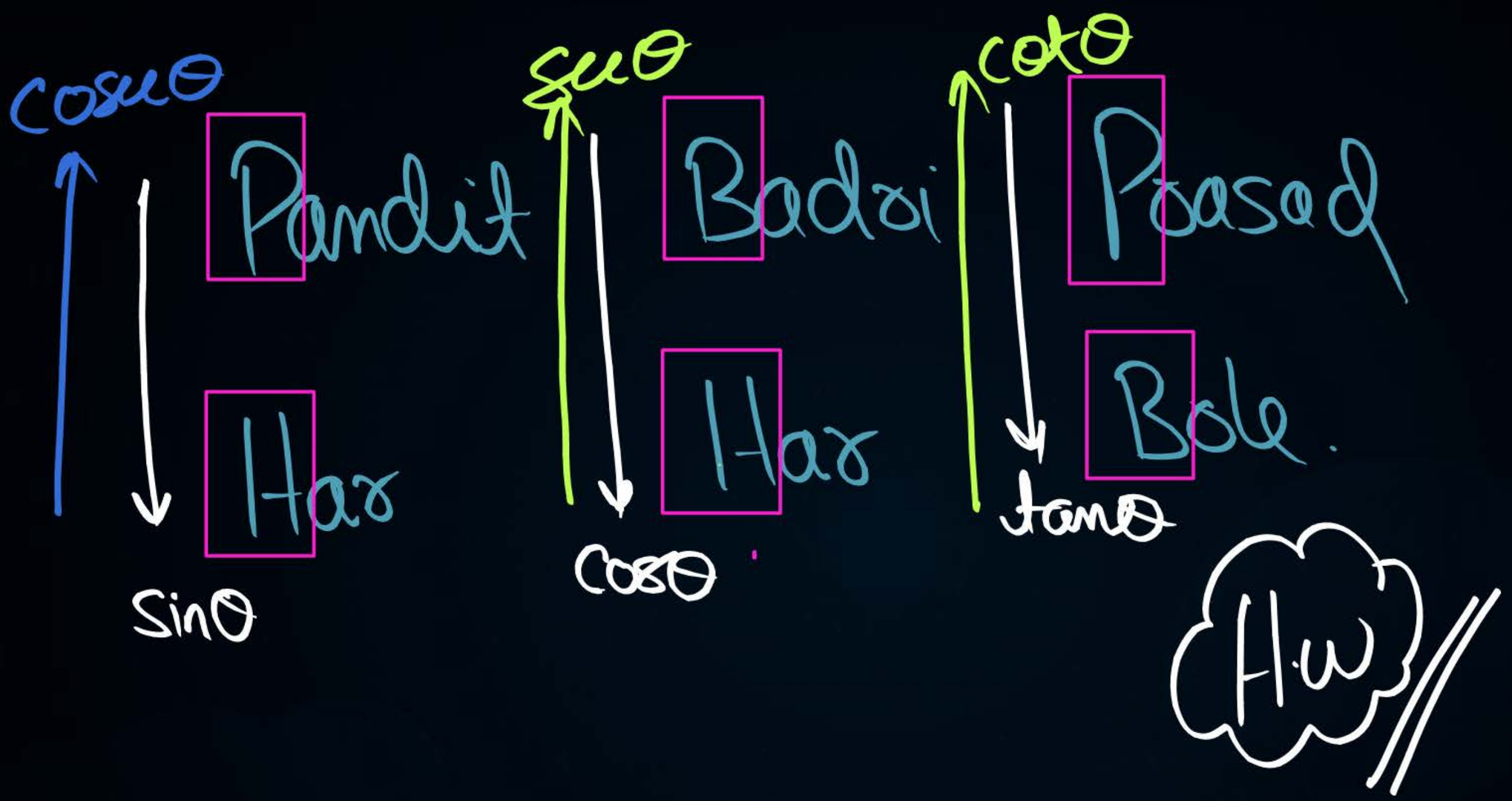
③ $\sec\theta = \frac{H}{B} = \frac{5}{3}$



Mistake

$\sin\theta \neq \sin\times\theta$

$\tan\theta \neq \tan\times\theta$


cosecθ
Pandit
Hax
sinθ
secθ
Badai
Hax
cosθ
cotθ
Prasad
Bole.
tanθ
H.W

- Trigonometry is derived from Greek words trigon (three sides) and metron (measure).

- Trigonometry is the branch of mathematics which deals with triangles, particularly triangles in a plane where one angle of triangle is 90°.

- Trigonometry specifically deals with relationships between the sides and the angles of a triangle

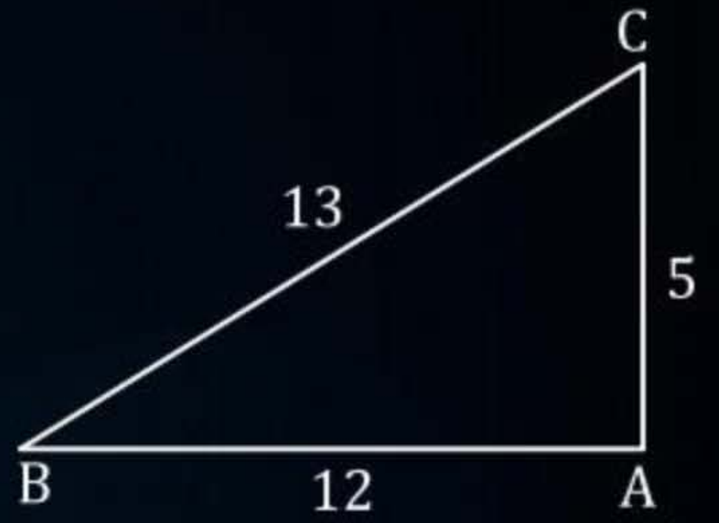
Topic : Some Important Points

(i) The symbol sin A is used as an abbreviation for ' the sine of $\angle A$'. sin A is not the product of 'sin' and 'A'. 'sin' separated from 'A' has no meaning. This interpretation follows for other trigonometric ratios also.

(ii) Each trigonometric ratio is a real number and has no unit.

Topic : T Ratios

#Q. In a ΔABC, right angled at A, if [illegible] and BC = 13 cm, find sin B, cos C and tan B.



$$\sin B = \frac{P}{H} = \frac{5}{13}$$

$$\cos C = \frac{B}{H} = \frac{5}{13}$$

$$\tan B = \frac{P}{B} = \frac{5}{12}$$

$$\frac{a}{b} = \frac{2}{3}$$

$a = 2x$

$b = 3x$

Topic : T Ratios

#Q. If $\sin A = \frac{3}{5}$, find cos A and tan A.

$\sin A = \frac{3}{5} = \frac{P}{H}$

$\frac{P}{H} = \frac{3}{5}$

$P = 3x$

$H = 5x$

$B = 9$

$H^2 = P^2 + B^2$

$(5x)^2 = (3x)^2 + (B)^2$

$25x^2 = 9x^2 + B^2$

$25x^2 - 9x^2 = B^2$

$16x^2 = B^2$

$\pm\sqrt{16x^2} = B$

$\pm 4x = B$

$B = 4x$

$\cos A = \frac{B}{H} = \frac{4x}{5x} = \frac{4}{5}$

$\tan A = \frac{P}{B} = \frac{3x}{4x} = \frac{3}{4}$

Topic : T Ratios

#Q. If $\cos B = \frac{1}{3}$, find the other five trigonometric ratios of $\angle B$.

$\cos B = \frac{1}{3}$

$\frac{B}{H} = \frac{1}{3}$

$B = 1x$

$H = 3x$

$P =$

$H^2 = P^2 + B^2$

$(3x)^2 = P^2 + (1x)^2$

$9x^2 - 1x^2 = P^2$

$8x^2 = P^2$

$\pm\sqrt{8x^2} = P$

$\pm\sqrt{2\times2\times2\times x\times x} = P$

$2\sqrt{2}x = P$

$\sin B = \frac{P}{H} = \frac{2\sqrt{2}x}{3x} = \frac{2\sqrt{2}}{3}$

$\tan B = \frac{P}{B} = \frac{2\sqrt{2}x}{1x} = 2\sqrt{2}$

$\sec B = \frac{H}{B} = \frac{3x}{1x} = \frac{3}{1}$

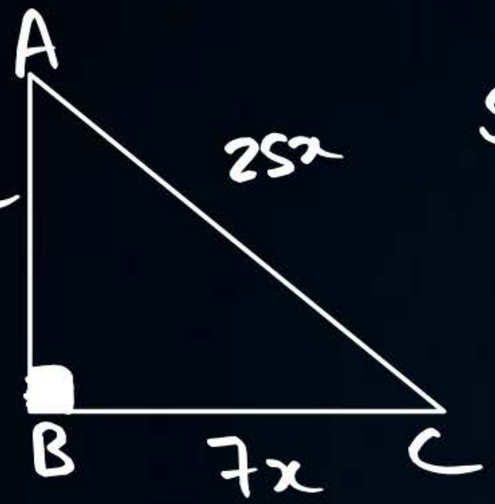
$\operatorname{cosec} B = \frac{H}{P} = \frac{3}{2\sqrt{2}}$

$\cot B = \frac{B}{P} = \frac{1}{2\sqrt{2}}$

Topic : T Ratios

#Q. In ΔABC right angled at B, $\sin A = \frac{7}{25}$, then the value of cos C is :

[CBSE, Board Term – I, 2021]



(A) 7/25

(B) 24/25

(C) 7/24

(D) 24/7

$\sin A = \frac{7}{25}$

$\frac{P}{H} = \frac{7}{25}$

$P = 7x$

$H = 25x$

$H^2 = P^2 + B^2$

$(25x)^2 = (7x)^2 + (B)^2$

$625x^2 = 49x^2 + B^2$

$625x^2 - 49x^2 = B^2$

$576x^2 = B^2$

$\pm\sqrt{576x^2} = B$

$24x = B$

$\cos C = \frac{B}{H} = \frac{7x}{25x}$

$= \frac{7}{25}$

$= \sqrt{576}$

$= \sqrt{2\times2 \quad 2\times2 \quad 2\times2 \quad 3\times1}$

$= 2\times2\times2\times3$

$= 24$

2	576
2	288
2	144
2	72
2	36
2	18
3	9
3	3
	1

Topic : T Ratios

#Q. If $\sin\theta = \frac{4}{5}$, find the value of $\frac{4\tan\theta - 5\cos\theta}{\sec\theta + 4\cot\theta}$.

$\sin\theta = \frac{4}{5}$

$\frac{P}{H} = \frac{4}{5}$

$P = 4x$

$H = 5x$

By P.T

$B = 3x$

$$= \frac{4\left(\frac{P}{B}\right) - 5\left(\frac{B}{H}\right)}{\left(\frac{H}{B}\right) + 4\left(\frac{B}{P}\right)}$$

$$= \frac{4\left(\frac{4x}{3x}\right) - 5\left(\frac{3x}{5x}\right)}{\left(\frac{5x}{3x}\right) + 4\left(\frac{3x}{4x}\right)}$$

$$= \frac{\frac{16}{3} - 3}{\frac{5}{3} + 3}$$

$$= \frac{\frac{16-9}{3}}{\frac{5+9}{3}}$$

$$= \frac{7}{14} = \frac{1}{2}$$

Topic : T Ratios ★★★★★★★

#Q. In a ΔABC right angled at C, if $\tan A = \frac{1}{\sqrt{3}}$,

Find the value of $\sin A \cos B + \cos A \sin B$. [CBSE 2008]

$\tan A = \frac{1}{\sqrt{3}}$

$\frac{P}{B} = \frac{1}{\sqrt{3}}$

$P = 1x$

$B = \sqrt{3}x$

$H = ?$

$H^2 = P^2 + B^2$

$H^2 = (1x)^2 + (\sqrt{3}x)^2$

$H^2 = 1x^2 + 3x^2$

$H^2 = 4x^2$

$H = \pm\sqrt{4x^2}$

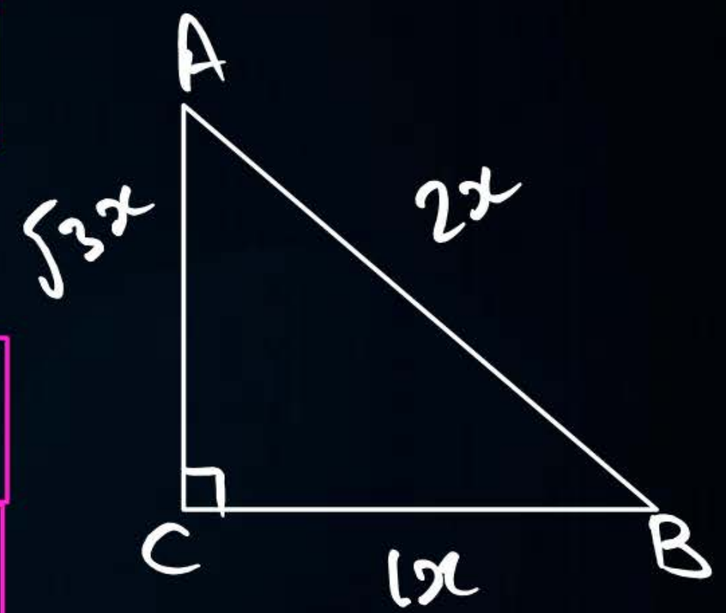
$H = +2x$

$\sin A = \frac{P}{H} = \frac{1}{2}$

$\cos B = \frac{B}{H} = \frac{1}{2}$

$\cos A = \frac{B}{H} = \frac{\sqrt{3}}{2}$

$\sin B = \frac{P}{H} = \frac{\sqrt{3}}{2}$

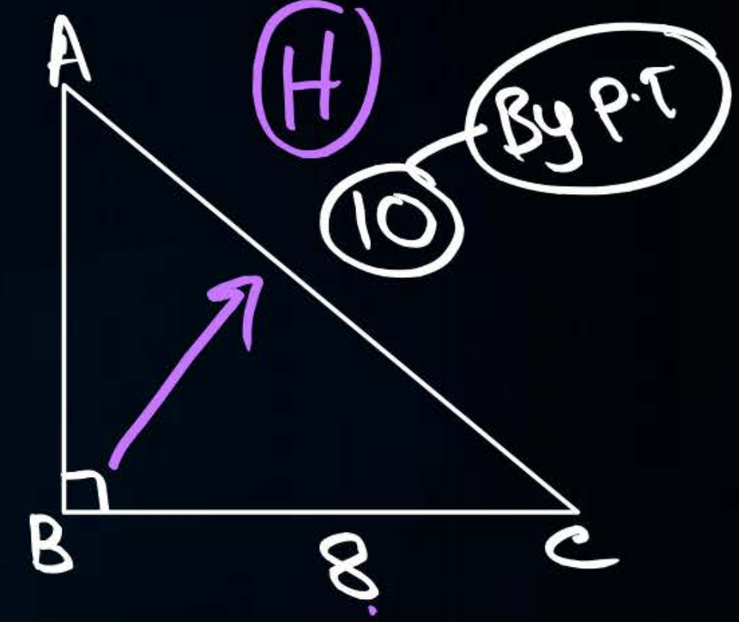


$= \frac{1}{2} \times \frac{1}{2} + \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2}$

$= \frac{1}{4} + \frac{3}{4} = \frac{4}{4} = 1$

Topic : T Ratios

#Q. If in a triangle ABC right angled at B, AB = 6 units and BC = 8 units, then find the value of $\sin A \cdot \cos C + \cos A \cdot \sin C$. [Board Term – I, 2016]



$\sin A = \frac{P}{H} = \frac{8}{10} = \frac{4}{5}$

$\cos C = \frac{B}{H} = \frac{8}{10} = \frac{4}{5}$

$\cos A = \frac{B}{H} = \frac{6}{10} = \frac{3}{5}$

$\sin C = \frac{P}{H} = \frac{3}{5}$

$= \frac{4}{5} \times \frac{4}{5} + \frac{3}{5} \times \frac{3}{5}$

$= \frac{16}{25} + \frac{9}{25}$

$= \frac{25}{25}$

$= 1$

Topic : T Ratios

#Q. If $\text{cosec } A = \sqrt{10}$, then find $\tan A$ and $\sec A$.

$\text{cosec } A = \sqrt{10}$

$\frac{H}{P} = \frac{\sqrt{10}}{1}$

$H = \sqrt{10}x$

$P = 1x$

$H^2 = P^2 + B^2$

$(\sqrt{10}x)^2 = (1x)^2 + (B)^2$

$10x^2 = 1x^2 + B^2$

$9x^2 = B^2$

$\pm 3x = B$

$3x = B$

$\tan A = \frac{P}{B} = \frac{1x}{3x} = \frac{1}{3}$

$\sec A = \frac{H}{B} = \frac{\sqrt{10}x}{3x} = \frac{\sqrt{10}}{3}$

Topic : T Ratios

#Q. If $\sin\theta = \frac{a}{b}$, then $\cos\theta$ is equal to [CBSE, Board Term – I, 2021]

A $\frac{b}{\sqrt{b^2 - a^2}}$

B $\frac{b}{a}$

C $\frac{\sqrt{b^2 - a^2}}{b}$

D $\frac{a}{\sqrt{b^2 - a^2}}$

$\sin\theta = \frac{a}{b}$

$\frac{P}{H} = \frac{a}{b}$

$H^2 = P^2 + B^2$

$(b)^2 = (a)^2 + B^2$

$b^2 - a^2 = B^2$

$\pm\sqrt{b^2 - a^2} = B$

$\sqrt{b^2 - a^2} = B$

$\cos\theta = \frac{B}{H}$

$\frac{\sqrt{b^2 - a^2}}{b}$

Homework

Question Bank

Page-278 → (2)

Q) $\tan\theta = \frac{2x(x+1)}{2x+1}$, $\sin\theta = ?$

$\cos\theta = ?$

There is an artist, who doesn't need to understand Math...

There is an entrepreneur, who doesn't care about History or English literature...

There is a musician, whose Chemistry marks won't matter...

There's an athlete... whose physical fitness is more important than Physics...

THANK YOU