# UPAAAA 2025

Trigonometry

**Mathematics** 

Lecture - 07

By - Ritik Sir



## TOPICS to be covered

Problems on Trigonometric Identities (Part -1)







$$\frac{\cos A}{1 - \tan A} + \frac{\sin^2 A}{\sin A - \cos A} = \sin A + \cos A$$

$$\frac{c}{1 - \tan A} + \frac{c}{\sin A} - \frac{c}{\cos A} = \frac{c^2}{c - c} + \frac{c^2}{c - c}$$

$$\frac{c}{1 - c} + \frac{c^2}{c - c} + \frac{c^2}{c - c} + \frac{c^2}{c - c}$$

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= 
$$\frac{c^2}{c \cdot s} + \frac{s^2}{s \cdot c}$$

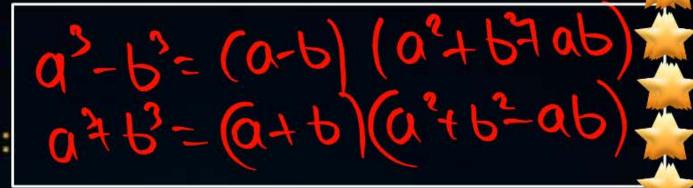
$$= \frac{(C+S)(S+S)}{(C+S)} = \frac{(C+S)(S+S)}{(C+S)}$$



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

$$\frac{c^2}{c^2} + \frac{s^2}{s^2}$$

$$\int_{-\infty}^{2} \frac{c^{2}}{c^{2}} + \frac{s^{2}}{c^{2}} +$$



$$\frac{\cos^2\theta}{1-\tan\theta} + \frac{\sin^3\theta}{\sin\theta - \cos\theta}$$

$$= \frac{C-S}{C_3} + \frac{S-C}{S-C}$$

$$= 1 + \sin\theta\cos\theta$$

$$= \frac{3}{3} - \frac{3}{3}$$

$$= \frac{c^{2} s^{2}}{c-s}$$

$$= \frac{(c^{2} s)(c^{2} + s^{2} + cs)}{(c^{2} s)}$$







$$\frac{\tan A}{1-\cot A} + \frac{\cot A}{1-\tan A} = 1 + \tan A + \cot A = 1 + \sec A \csc A$$

$$\int_{-3}^{2} \frac{3^{2}}{3^{2}-1} \frac{3}{3^{2}-1}$$

$$= \frac{3^{2}-1}{3^{2}-1}$$

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## Jon At WAA+1 = 1+ Sec A Cosec A



$$\frac{1}{cs} + \frac{1}{cs} = \frac{1}{cs} + 1 = \frac{1}{sc} + \frac{1}{cs} = \frac{1}{cs} + 1$$





$$\frac{1-\cot A}{1-\tan A} = 1 + \tan A + \cot A$$

$$\frac{S}{S} + \frac{S}{S} +$$

$$= \frac{S^{2}}{CS} \frac{C^{3}}{(S+C^{2}+SC)}$$

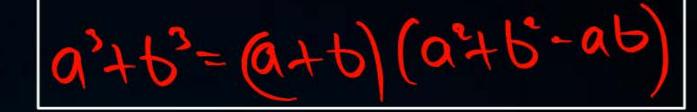
$$= \frac{S^{2}}{CS} \frac{(S+C^{2}+SC)}{(S+C^{2}+SC)}$$

$$= \frac{S^{2}}{CS} \frac{C^{2}+SC}{CS}$$

$$= \frac{S^{2}}{CS} + \frac{C^{2}+SC}{CS} + \frac{C^{2}+SC}{CS}$$

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$$= \frac{S^{2}}{CS} + \frac{C^{2}+SC}{CS} +$$





**#Q.** Prove the following identity:

$$\frac{\sin^3\theta + \cos^3\theta}{\sin\theta + \cos\theta} + \sin\theta \cos\theta = 1$$

(Sinextcoso)

#### **#Q.** Prove the following identity:

 $\frac{(1+\cot A+\tan A)(\sin A-\cos A)}{\sec^3 A-\csc^3 A}=\sin^2 A\cos^2 A$ 

$$\frac{\left(1+\frac{2}{5}+\frac{2}{5}\right)\left(S-c\right)}{\frac{1}{53}-\frac{1}{53}}$$

$$= \frac{\left(\frac{SC+C^2+S^2}{SC}\right)\left(\frac{SC}{SC}\right)}{\frac{S^3-C^3}{C^3C^3}}$$



## ®

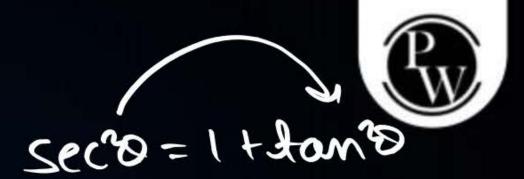
[CBSE 2008

$$tan^2\theta + cot^2\theta + 2 = sec^2\theta cosec^2\theta$$

$$=\frac{1}{\cos 0}+\frac{1}{\sin 6}$$



#### #Q. The value of $\frac{\sin\theta \tan\theta}{\cos\theta}$ $+ \tan^2 \theta - \sec^2 \theta$ is



A 
$$\sin\theta\cos\theta = \frac{S(S)}{I-C}$$



$$=\frac{1-c}{2s^2-1(1-c)}$$

 $\tan \theta$ 

#Q. 
$$\cos^4 x - \sin^4 x = = (c^2)^2 - (s^2)^2$$
  
 $(0)^2 - (b)^2 - (a+b)(a-b)$ 

$$\triangle$$
 2sin<sup>2</sup> x – 1

$$-1 + 2\cos^2 x = (c^2 + S^2)(c^2 - S^2)$$

$$c$$
  $\sin^2 x - \cos^2 x =$ 

$$= \frac{1-2}{2}$$

$$= \frac{1-2}{2}$$

$$= \frac{1-2}{2}$$

$$= \frac{5c_5}{1+c_5}$$



#Q. Prove the following identity:  $(\sin^4\theta - \cos^4\theta + 1)\csc^2\theta = 2$ 

$$= \left[ (s^2)^2 - (c^2)^2 + 1 \right] Cose(6)$$

$$= (S_5 + S_5) \cos(5)$$



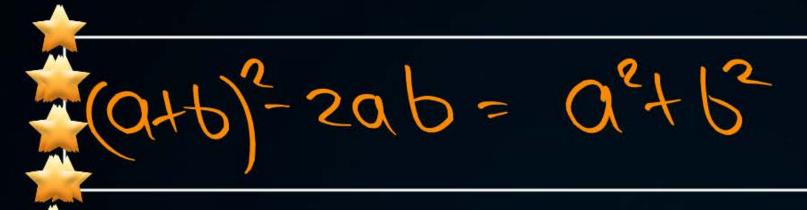
#Q. 
$$\frac{\sin^4\theta - \cos^4\theta}{1 - \sin^2\theta} = \text{how much?}$$

(B) 
$$1 - \cot^2\theta$$
 =  $(S^2)^2 - (C^2)^2$   
(B)  $1 - \tan^2\theta$ 

$$c \tan^2\theta - 1 = \frac{(s^2 + c^2)(s^2 - c^2)}{1 - c^2}$$

(a+6)2= a2+67+2a6





#Q. Prove the following identity:  $\sin^4 A + \cos^4 A = 1 - 2\sin^2 A \cos^2 A$ 

$$= (s^2)^2 + (c^2)^2 - 2s^2c^2$$

$$= (s^2 + c^2)^2 - 2s^2c^2$$



Pw

#Q. 
$$\frac{1+\tan^2 A}{1+\cot^2 A}$$
 is equal to:

- A sec<sup>2</sup>A <u>Sec<sup>2</sup>A</u> Cosec<sup>2</sup>A
- **B** -1
- C cot<sup>2</sup>A
- D tan<sup>2</sup>A

#### **#Q.** Prove the following identity:

$$\frac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \frac{1 + \sin\theta}{\cos\theta}$$



$$= \frac{1}{\cos 0} + \frac{1}{\sin 0}$$

$$= \frac{1}{\cos 0} + \frac{1}{\cos 0} = \frac{1}{\cos 0}$$

## By

#### **#Q.** Prove the following identity:

$$\frac{\cot A + \csc A - 1}{\cot A - \csc A + 1} = \frac{1 + \cos A}{\sin A}$$

$$= \frac{(\text{CodA+cosecA}) \left[1-(\text{coseA-codA})\right]}{\text{COSEA+1}}$$



#### **#Q.** Prove the following identity:

$$\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \frac{1}{\sec\theta - \tan\theta}$$







$$\frac{\cos A}{1-\sin A} + \frac{\sin A}{1-\cos A} + \frac{\sin A\cos A}{1-\sin A)(1-\cos A)}$$

$$=\frac{C(1-c)+s(1-s)+1(1-s)(1-c)}{(1-s)(1-c)}$$

$$= 2^{2}-c^{2}+8-s^{2}+1-(-8+sc)$$

$$(1-s)(1-c)$$

$$\int_{-\infty}^{\infty} \frac{-(2-s^2+1+sc)}{(1-s)(1-c)} = \frac{-(2+s^2)+1+8c}{(1-s)(1-c)}$$



#Q. 
$$\cot^2 A \left( \frac{\sec A - 1}{1 + \sin A} \right) + \sec^2 A \left( \frac{\sin A - 1}{1 + \sec A} \right) = 0$$

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$$\cot^2 A \left( \frac{\cot A - 1}{1 +$$

(1+5MA) (1+5xcA)



#### Homework





