

# GOOGLE ACADEMY

CLASSES - V to XII (All subjects for CBSE/ICSE/ISC) & IIT, NEET (Foundation)

by- **SUSHEEL BHATT** (FOUNDER & FACULTY OF MATHEMATICS)

Add- Near Dabouli Durga Mandir, Kanpur.

Mob no. -6306893082, 9305617040 TOPIC - TRIGONOMETRY 1

Class - XI<sup>th</sup>

Q1) Prove that :- 
$$\frac{\sin(n+y)}{\sin(n-y)} = \frac{\sin n \cos y + \cos n \sin y}{\sin n \cos y - \cos n \sin y}$$

Q2) Prove that :- 
$$\frac{\tan\left(\frac{\pi}{4} + \alpha\right)}{\tan\left(\frac{\pi}{4} - \alpha\right)} = \left(\frac{1 + \tan \alpha}{1 - \tan \alpha}\right)^2$$

Q3) If  $\tan A - \tan B = x$  and  $\cot B - \cot A = y$ ,  
Prove that  $\cot(A-B) = \frac{1}{x} + y$ .

Q4) If  $\alpha$  and  $\beta$  are acute angles such that  
 $\tan \alpha = \frac{m}{m+1}$  and  $\tan \beta = \frac{1}{2m+1}$ , prove that

$$\alpha + \beta = \frac{\pi}{4}$$

Q5) If  $\tan B = \frac{n \sin \alpha \cos \alpha}{1 - n \sin^2 \alpha}$ , show that  $\tan(\alpha - B)$

$$= (1 - n) \tan \alpha$$

Q6) Prove that :-

(i)  $\tan 3\alpha \tan 2\alpha \tan \alpha = \tan 3\alpha - \tan 2\alpha - \tan \alpha$

(ii)  $\cot \alpha \cot 2\alpha - \cot 2\alpha \cot 3\alpha - \cot 3\alpha \cot \alpha = 1$

Q.7 → prove that:  $\sin^2 6n - \sin^2 4n = \sin 2n \sin 10n$

Q.8 → If  $3 \tan A \tan B = 1$ , prove that  $2 \cos(A+B) = \cos(A-B)$

Q.9 → If  $\sin B = 3 \sin(2A+B)$ , prove that  $2 \tan A + \tan(A+B) = 0$ .

Q.10 → If  $\cos(A+B) = \frac{4}{5}$ ,  $\sin(A-B) = \frac{5}{13}$  and  $A, B$  lie between 0 and  $\frac{\pi}{4}$ , prove that  $\tan 2A = \frac{56}{33}$

Q.11 → prove that:  $\tan 70^\circ = \tan 20^\circ + 2 \tan 50^\circ$ .

Q.12 → If  $\tan(a+n) = n \tan(a-n)$ , show that:  $(n+1) \sin 2n = (n-1) \sin 2a$ .

Q.13 → Prove that:

(i)  $\tan 8n - \tan 6n - \tan 2n = \tan 8n \tan 6n \tan 2n$ .

(ii)  $\tan 13n - \tan 9n - \tan 4n = \tan 13n \tan 9n \tan 4n$ .

Q.14 → prove that:  $\frac{\tan^2 2n \cdot \tan^2 n}{1 - \tan^2 2n \tan^2 n} = \tan 3n \tan n$

Q.15 → If  $\frac{\sin(x+y)}{\sin(x-y)} = \frac{a+b}{a-b}$ , show that  $\frac{\tan x}{\tan y} = \frac{a}{b}$ .

Q.16 → If  $\tan A + \tan B = a$  and  $\cot A + \cot B = b$ , prove that:  $\cot(A+B) = \frac{1}{a} - \frac{1}{b}$ .