

## CHP 8

### INTROCTION TO TRIGONOMETRY (Assignment)

1. Write the values of  $\sec 0^\circ$ ,  $\sec 30^\circ$ ,  $\sec 45^\circ$ ,  $\sec 60^\circ$  and  $\sec 90^\circ$ . What happens to  $\sec x$  when  $x$  increases from  $0^\circ$  to  $90^\circ$ ?
2. Given  $\tan A = 5/12$ , find the other trigonometric ratios of the angle  $A$ .
3. Prove that  $1/\sec A - \tan A - 1/\cos A = 1/\cos A - 1/\sec A + \tan A$
4. If  $\sin \theta = 12/13$ ,  $0^\circ < \theta < 90^\circ$ , find the value of:  $\sin^2 \theta - \cos^2 \theta / 2 \sin \theta \cdot \cos \theta \times 1/\tan^2 \theta$
5. If  $\sin(A + B) = 1$  and  $\tan(A - B) = 1/\sqrt{3}$ , find the value of:
  - a)  $\tan A + \cot B$
  - b)  $\sec A - \operatorname{cosec} B$
6. If  $\sec A = x + 1/4x$ , prove that  $\sec A + \tan A = 2x$  or  $1/2x$

7. **Prove that:** 
$$\frac{\tan^3 \theta}{1 + \tan^2 \theta} + \frac{\cot^3 \theta}{1 + \cot^2 \theta} = \sec \theta \operatorname{cosec} \theta - 2 \sin \theta \cos \theta$$

8. **If  $A + B = 90^\circ$ , prove that:** 
$$\sqrt{\frac{\tan A \tan B + \tan A \cot B}{\sin A \sec B} - \frac{\sin^2 B}{\cos^2 A}} = \tan A$$

9. If  $\sec \theta - \tan \theta = x$ , show that:  $\sec \theta = 1/2(x + 1/x)$  and  $\tan \theta = 1/2(1/x - x)$
10. Prove the following identity:  $\sin^3 \theta + \cos^3 \theta / \sin \theta + \cos \theta = 1 - \sin \theta \cdot \cos \theta$
11. If  $7\sin^2 A + 3\cos^2 A = 4$ , show that  $\tan A = 1/\sqrt{3}$
12. For any acute angle  $\theta$ , prove that
  1.  $\sin^2 \theta + \cos^2 \theta = 1$
  2.  $1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$

13. **Prove that:** 
$$\sqrt{\sec^2 \theta + \operatorname{cosec}^2 \theta} = \tan \theta + \cot \theta$$

14.

**Prove that:** 
$$\frac{\sin A + \cos A}{\sin A - \cos A} + \frac{\sin A - \cos A}{\sin A + \cos A} = \frac{2}{1 - 2 \cos^2 A}$$

15. If  $\sin \theta = x$  and  $\sec \theta = y$  then find the value of  $\cot \theta$ .

16.

**Simplify the following expressions:**  $\frac{\sin^3 \theta + \cos^3 \theta}{\sin \theta + \cos \theta}$ .

17. Find the value of  $\sec^2 42^\circ - \operatorname{cosec}^2 48^\circ$ .

18. If  $(1 + \cos A)(1 - \cos A) = 3/4$ , find the value of  $\sec A$

19. Find the value of  $\tan(65^\circ - \theta) - \cot(25^\circ + \theta)$

20. Solve the equation for  $\theta$ :  $\cos^2 \theta / \cot^2 \theta - \cos^2 \theta = 3$

21. If A, B, and C are the interior angles of a  $\Delta ABC$ , show that  $\tan(A+B/2) = \cot C/2$

22. If  $\sin A = \cos A$ , find the value of  $2\tan^2 A + \sin^2 A + 1$ .

23. If  $\tan(A - B) = 1/\sqrt{3}$  and  $\tan(A + B) = \sqrt{3}$ , find A and B.

24. If  $ax = r \cos \theta$ ,  $ay = r \sin \theta$ ,  $az = r \cos \phi$ . Prove that  $x^2 + y^2 + z^2 = r^2$

25

**Evaluate:** 
$$\frac{3 \tan 25^\circ \cdot \tan 40^\circ \cdot \tan 50^\circ \cdot \tan 65^\circ - \frac{1}{2} \tan^2 60^\circ}{4(\cos^2 29^\circ + \cos^2 61^\circ)}$$

26.

**Prove that** 
$$\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}$$

27. If  $\operatorname{cosec} A + \cot A = m$ , show that  $m^2 - 1 / m^2 + 1 = \cos A$ .

28. Prove that:  $(\sec \theta + \tan \theta)^2 = \operatorname{cosec} \theta + 1 / \operatorname{cosec} \theta - 1$

29. If  $\operatorname{cosec} \theta + \cot \theta = q$ , show that  $\operatorname{cosec} \theta - \cot \theta = 1/q$  and hence find the values of  $\sin \theta$  and  $\sec \theta$

**Evaluate:** 
$$\frac{4 \cot^2 60^\circ + \sec^2 30^\circ - 2 \sin^2 45^\circ}{\sin^2 60^\circ + \cos^2 45^\circ}$$

30.

31. If  $\sec \theta + \tan \theta = p$ , then find the value of  $\operatorname{cosec} \theta$

32. Evaluate:  $4(\sin 430^\circ + \cos 460^\circ) - 3(\cos^2 45^\circ - \sin^2 90^\circ)$

33.

**Find the value of x if** 
$$4 \left( \frac{\sec^2 59^\circ - \cot^2 31^\circ}{3} \right) - \frac{2}{3} \sin 90^\circ + 3 \tan^2 56^\circ \times \tan^2 34^\circ = \frac{x}{3}$$

34.

**If  $A + B = 90^\circ$ , prove that**

$$\sqrt{\frac{\tan A \tan B + \tan A \cot B}{\sin A \sec B} - \frac{\sin^2 B}{\cos^2 A}} = \tan A$$

35. If  $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$ , prove that  $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$