

TRIGONOMETRY

WORK SHEET (I)

1. If $\cos A = \frac{12}{13}$, then find $\sin A$, $\tan A$, $\cot A$.
2. If $5 \sec \Theta - 12 \operatorname{cosec} \Theta = 0$. then find $\tan \Theta$, $\sin \Theta$, $\sec \Theta$.
3. If $\sin \Theta = \frac{m^2 - n^2}{m^2 + n^2}$, find $\tan \Theta$ and $\sec \Theta$.
4. If $\sin A = \frac{1}{3}$, evaluate $\cos A \operatorname{cosec} A + \tan A \sec A$.
5. If $\cos A = \frac{3}{5}$, evaluate $\frac{\sin A \cdot \tan A - 1}{2 \tan^2 A}$.
6. If $\tan A = \sqrt{2} - 1$, prove that $\sin A \cos A = \frac{1}{2\sqrt{2}}$.
7. If $\sin A = \frac{3}{5}$ and $\sin B = \frac{5}{13}$, find the value of $\sin A \cos B + \cos A \sin B$.
8. If $3 \sin A - 4 \cos A = 0$, then find the values of $\tan A$, $\sec A$ and $\operatorname{cosec} A$.
9. Find the value of $\sin x$, if $8 \sin x - \cos x = 4$.
10. Find the value of $\cos A$, if $\operatorname{cosec} A - \cot A = \frac{6}{5}$.
11. Find the value of $\sin A$, if $\sec A + \tan A = 5$.
12. Find the value of A , if $\tan 2A = \sqrt{3}$.
13. Solve for A , if $\sin A - \cos A = 0$.
14. If $\sin(A + B) = 1$ and $\cos(A - B) = \frac{\sqrt{3}}{2}$, find A and B .
15. Find the value of B if $\cos 3B = \frac{1}{\sqrt{2}}$.
16. Find the value of x , if $x \sin 45^\circ \cdot \cos 45^\circ \tan 60^\circ = \cot^2 45^\circ - \cos^2 60^\circ$.
17. Find the values of A and B , if $\sin(A - B) = \cos(A + B) = \frac{1}{2}$.
18. Find the values of A and B , if $\sin(A + B) = 1$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$.
19. If $\cos(40^\circ + x) = \sin 30^\circ$, find the value of x .
20. If $\sin A = \frac{1}{2}$ and $\cos B = \frac{\sqrt{3}}{2}$, find $A + B$.
21. If $\tan 2A = \cot(A - 18^\circ)$, where $2A$ is an acute angle, find the value of A .
22. If $\tan A = \cot B$, prove that $A + B = 90^\circ$.
23. If $\sec 4A = \operatorname{cosec}(A - 20^\circ)$, where $4A$ is an acute angle, find the value of A .
24. Prove that:
 - (a) $\sin(90^\circ - A) \cdot \cos(90^\circ - A) = \frac{\tan A}{1 + \tan^2 A}$.
 - (b) $\tan 10^\circ \tan 15^\circ \tan 75^\circ \tan 80^\circ = 1$.
 - (c) $\tan 1^\circ \tan 2^\circ \tan 3^\circ \dots \dots \dots \tan 89^\circ = 1$.
 - (d) $\cos A \sin(90^\circ - A) + \sin A \cos(90^\circ - A) = 1$.
25. If A , B and C are the angles of a right - angled triangle ABC , right angled at B then prove that: (a) $\sin^2 A + \sin^2 C = 1$ (b) $1 + \tan^2 A = \operatorname{cosec}^2 C$
26. Eliminate Θ , if
 - (i) $p = a \operatorname{cosec} \Theta$; $q = b \cot \Theta$ (ii) $p = 3 \cos \Theta - 2 \sin \Theta$; $q = 3 \sin \Theta + 2 \cos \Theta$
 - (iii) $p = 7 \tan \Theta + 4 \sec \Theta$; $q = 4 \tan \Theta + 7 \sec \Theta$

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WORK SHEET (II)

Prove that:

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

$$2. \frac{1}{1+\sin A} + \frac{1}{1-\sin A} = 2 \sec^2 A$$

$$3. \frac{\cot A + \cos A}{\cot A - \cos A} = \frac{\operatorname{cosec} A + 1}{\operatorname{cosec} A - 1}.$$

$$4. (\operatorname{cosec} A - \cot A)^2 = \frac{1 - \cos A}{1 + \cos A}$$

$$5. \frac{\sin A}{1+\cos A} + \frac{1+\cos A}{\sin A} = 2 \operatorname{cosec} A$$

$$6. (1 + \cot A - \operatorname{cosec} A)(1 + \tan A + \sec A) = 2$$

$$7. (\operatorname{cosec} \theta - \sin \theta)(\sec \theta - \cos \theta)(\tan \theta + \cot \theta) = 1$$

$$8. \sin^2 \theta \cdot \tan \theta + \cos^2 \theta \cdot \cot \theta + 2 \sin \theta \cos \theta = \tan \theta + \cot \theta$$

$$9. \frac{\sec A - \tan A}{\sec A + \tan A} = 1 - 2 \sec A \cdot \tan A + 2 \tan^2 A$$

$$10. \frac{\cos A}{1 - \sin A} + \frac{\sin A}{1 - \cos A} + 1 = \frac{\sin A \cdot \cos A}{(1 - \sin A)(1 - \cos A)}$$

$$11. \tan^2 A - \tan^2 B = \frac{\sin^2 A - \sin^2 B}{\cos^2 A \cdot \cos^2 B} = \frac{\cos^2 B - \cos^2 A}{\cos^2 B \cdot \cos^2 A}$$

$$12. \frac{\sec A - \tan A}{\sec A + \tan A} = \frac{\cos^2 A}{(1 + \sin A)^2}$$

$$13. \frac{1}{\sec A + \tan A} - \frac{1}{\cos A} = \frac{1}{\cos A} - \frac{1}{\sec A - \tan A}$$

$$14. \left(\frac{1 + \sin A - \cos A}{1 + \sin A + \cos A} \right)^2 = \frac{1 - \cos A}{1 + \cos A}$$

$$15. \left(\tan A + \frac{1}{\cos A} \right)^2 + \left(\tan A - \frac{1}{\cos A} \right)^2 = 2 \left(\frac{1 + \sin^2 A}{1 - \sin^2 A} \right)$$

$$16. \frac{\sin A}{\sec A + \tan A - 1} + \frac{\cos A}{\operatorname{cosec} A + \cot A - 1} = 1$$

$$17. \text{If } \sin \theta + \cos \theta = a, \sin \theta - \cos \theta = b, \text{ then prove that: } a^2 + b^2 = 2.$$

$$18. \text{If } x = a \sec \theta + b \tan \theta, y = a \tan \theta + b \sec \theta, \text{ then prove that: } x^2 - y^2 = a^2 - b^2.$$

$$19. \text{If } \operatorname{cosec} A - \sin A = x^3, \sec A - \cos A = y^3, \text{ then prove that: } x^2 y^2 (x^2 + y^2) = 1.$$

$$20. \text{If } \sin A + \sin^2 A = 1, \text{ then prove that: } \cos^2 A + \cos^4 A = 1.$$

$$21. \text{If } \sin A + \cos A = p, \sec A + \operatorname{cosec} A = q, \text{ then prove that: } q(p^2 - 1) = 2p.$$

$$22. \text{If } x \sin A + y \cos A = z, \text{ find } x \cos A - y \sin A.$$

$$23. \text{Find } x, \text{ if } \tan 3x = \sin 45^\circ \cos 45^\circ + \sin 30^\circ.$$

$$24. \text{If } x \sin^3 A + y \cos^3 A = \sin A \cos A \text{ and } x \sin A = y \cos A, \text{ prove that: } x^2 + y^2 = 1.$$

$$25. \text{If } \cos^2 A - \sin^2 A = \tan^2 B, \text{ prove that: } \cos B = \frac{1}{\sqrt{2} \cos A}.$$