Er Manish Bhadoria's Interactions Study Circle
Strong Foundation for a bright future

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08 Trigonometry

(Work Sheet – 1)

1. Given cos A = $\frac{\sqrt{3}}{2}$, find all other trigonometric ratios of the angle A.
2. If tan θ = $\frac{5}{12}$, calculate all other trigonometric ratios.
3. If cosec A = $\sqrt{10}$, find other five trigonometric ratios.
4. In ΔABC, ∠B = 90°, AB = 3 cm, AC = 5 cm. Find tan A – cot C.
5. If ∠A and ∠B are acute angles such that cos A = cos B, then show that ∠A = ∠B.
6. If 3 cot A = 4, check whether $\frac{1-\tan^2 A}{1+\tan^2 A}$ = cos² A – sin² A or not.
7. If sin θ = $\frac{a^2-b^2}{a^2+b^2}$, find the values of other five trigonometric ratios.
8. If cosec A = 2, find the value of $\frac{1}{\tan A}+\frac{\sin A}{1+\cos A}$.
9. If tan A = $\sqrt{2}$ - 1, show that sin A cos A = $\frac{\sqrt{2}}{4}$.
10. In ΔABC, right angled at B, if ∠A = ∠C = 45°, then prove that:
    (i) sin A = sin C, (ii) sin A + cos A = $\sqrt{2}$, (iii) tan A + cot A = 2.
11. In ΔABC, ∠A = 90°, sin B = $\frac{3}{8}$. Prove that sec B + tan B = $\sqrt{\frac{11}{5}}$.
12. In ΔABC, right angled at C, BC = 12 units, AC = $4\sqrt{2}$ units and ∠ABC = θ. Determine the values of:
    (i) cos² θ + sin² θ, (ii) sin θ × cos θ, (iii) cos⁴ θ + sin⁴ θ
13. If sin θ = $\frac{1}{2}$, verify that 2 sin θ.cos θ = $\frac{2\tan\theta}{1+\tan^2\theta}$.

14. If $\sin\theta = \frac{m}{n}$, show that $\frac{\tan\theta + 4}{4\cot\theta + 1} = \frac{m}{\sqrt{n^2 - m^2}}$.

15. In ΔABC, $\angle B = 90°$, BC = 5 cm and AC – AB = 1 cm. Evaluate $\frac{1+\sin C}{\cos C}$.

16. If θ be an acute angle and 5 cosec θ = 7, then evaluate:
    (i) $\sin^2\theta - \cos^2\theta$, (ii) $\sin\theta + \cos^2\theta - 1$, (iii) $1 + \sqrt{6}\cos\theta + 6\sin\theta$

17. In right angled ΔABC, $\angle A = \theta$ and $\angle B = 90°$.
    (i) If 3 tan θ = 4, verify that $\frac{1-\tan^2\theta}{1+\tan^2\theta} = 1 - 2\sin^2\theta$.
    (ii) If sec $\theta = \frac{13}{5}$, show that $\frac{2\sin\theta - 3\cos\theta}{4\sin\theta - 9\cos\theta} = 3$.
    (iii) If tan $\theta = \sqrt{3}$, show that $\frac{1-\cos^2\theta}{2-\sin^2\theta} = \frac{3}{5}$.
    (iv) If $\sin\theta = \frac{3}{4}$, show that $\sqrt{\frac{\operatorname{cosec}^2\theta - \cot^2\theta}{\sec^2\theta - 1}} = \frac{\sqrt{7}}{3}$.
    (v) If $\sin\theta = \frac{a}{b}$, show that $\sec\theta + \tan\theta = \sqrt{\frac{b+a}{b-a}}$.
    (vi) If 2 cos θ + 5 sin θ = 4 cos θ – 3 sin θ, show that $\tan\theta = \frac{1}{4}$.
    Hence show that $\sin\theta = \frac{1}{\sqrt{15}}$.
    (vii) If 3 cos θ – 4 sin θ = 2 cos θ + sin θ, show that $\sin\theta \times \cos\theta = \frac{5}{26}$.

18. In ΔABC, $\angle B = 90°$, $\angle C = \theta$ and $\tan\theta = \frac{3x}{4y}$.

Show that: $\frac{\sin\theta + \cos\theta}{3x + 4y} = \frac{1}{\sqrt{9x^2 + 16y^2}}$.

19. In ΔABC, $\angle C = 90°$. If $\sin B = \frac{m^2 - n^2}{m^2 + n^2}$, show that sec B + tan B = $\frac{m}{n}$.

20. If cosec $\alpha = \frac{7}{2}$, verify that $\frac{\cot\alpha}{1+\cot^2\alpha} = \frac{\cos\alpha}{\operatorname{cosec}\alpha}$.

21. In ΔABC, $\angle A = \theta$ and $\angle B = 90°$; in ΔPQR, $\angle P = \alpha$ and $\angle Q = 90°$.
    If $\tan\theta = \frac{1}{2}$ and $\tan\alpha = \frac{3}{4}$, find $\sin\theta\cos\alpha + \cos\theta\sin\alpha$.

22. In right angled $\angle ABC$, $\angle A = \theta$ and $\angle B = 90°$.
    If $\tan\theta + \frac{1}{\tan\theta} = 2$, find:
    (i) $\tan^2\theta + \frac{1}{\tan^2\theta}$, (ii) $\tan^3\theta + \frac{1}{\tan^3\theta}$, (iii) $\tan\theta$, (iv) $\sin\theta + \cos\theta$.

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23. In ΔABC right angled at C, AC = 20 cm and AB – BC = 8 cm. Determine the value of sec A + tan A.

24. In ΔABC, $\angle A = \theta$ and $\angle B = 90°$. If $\sec\theta = \frac{1+t^2}{2t}$ and $0 < t < 1$, show that $\sin\theta + t\cos\theta = 1$.

25. If sec A = $\frac{17}{8}$, verify that $\frac{3 - 4\sin^2 A}{4\cos^2 A - 3} = \frac{3 - \tan^2 A}{1 - 3\tan^2 A}$.

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