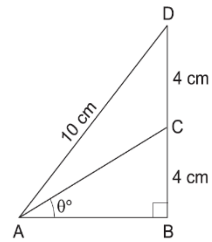
Board – ICSE | Class – 9 | Topic – Trigonometric Ratios

1. If $\sin\ \theta = \frac{a^2-b^2}{a^2+b^2}$, find the values of all Trigonometric ratios of θ.
2. If $15\cot\ A = 8$, find the values of $\sin\ A$ and $\sec\ A$.
3. If $\sin\ A = \frac{9}{41}$, find the values of $\cos\ A$ and $\tan A$.
4. If $\cos\ \theta = 0.6$, Evaluate $(5\sin\ \theta - 3\tan\ \theta)$.
5. If $\operatorname{cosec}\ \theta = 2$, Evaluate $\left(\cot\ \theta + \frac{\sin\ \theta}{1+\cos\ \theta}\right)$.
6. If $\tan\ \theta = \frac{1}{\sqrt{7}}$, show that $\frac{(\operatorname{cosec}^2\ \theta-\sec^2\ \theta)}{(\operatorname{cosec}^2\ \theta+\sec^2\ \theta)}$.
7. If $\tan\ \theta = \frac{20}{21}$, show that $\frac{(1-\sin\ \theta+\cos\ \theta)}{(1+\sin\ \theta+\cos\ \theta)}$.
8. If $\sec\ \theta = \frac{5}{4}$, show that $\frac{(\sin\ \theta-2\cos\ \theta)}{(\tan\ \theta-\cot\ \theta)}$.
9. If $\cot\ \theta = \frac{3}{4}$, show that $\sqrt{\frac{\sec\ \theta-\operatorname{cosec}\ \theta}{\sec\ \theta+\operatorname{cosec}\ \theta}}$.
10. If $\sin\ \theta = \frac{3}{4}$, show that $\sqrt{\frac{\operatorname{cosec}^2\ \theta-\cot^2\ \theta}{\sec^2\ \theta-1}}$.
11. If $\sin\ \theta = \frac{a}{\mathrm{b}}$, show that $(\sec\ \theta + \tan\ \theta) = \sqrt{\frac{b+a}{b-a}}$.
12. In the adjoining figure, $\angle B = 90°, \angle BAC = \theta°, BC = CD = 4$ cm and $AD = 10$ cm. Find (i) $\sin\ \theta$ and (ii) $\cos\ \theta$.



13. In a $\triangle\ ABC, \angle C = 90°, \angle ABC = \theta°, BC = 21$ units and $AB = 29$ units. Show that $(\cos^2\ \theta - \sin^2\ \theta) = \frac{41}{841}$.
14. In a $\triangle\ ABC, \angle B = 90°, AB = 12$ cm and $BC = 5$ cm.
    Find (i) $\cos\ A$
    (ii) $\operatorname{cosec}\ A$

(iii) $\cos\ C$

(iv) $\operatorname{cosec}\ C$

15. If $\sin\ \alpha = \frac{1}{2}$, prove that $(3\cos\ \alpha - 4\cos^3\ \alpha) = 0$.
16. If $\angle A$ and $\angle B$ are acute angles such that $\sin\ A = \sin\ B$ then prove that $\angle A = \angle B$.
17. If $\angle A$ and $\angle B$ are acute angles such that $\tan\ A = \tan\ B$ then prove that $\angle A = \angle B$.
18. In a right $\triangle\ ABC$, right-angled at B, if $\tan\ A = 1$ then verify that

    , $2\sin\ A \cdot \cos\ A = 1$.
19. If $x = \operatorname{cosec}\ A + \cos\ A$ and $y = \operatorname{cosec}\ A - \cos\ A$,then prove that,

$$\left(\frac{2}{x+y}\right)^2 + \left(\frac{x-y}{2}\right)^2 - 1 = 0$$

20. If $x = \cot\ A + \cos\ A$ and $y = \cot\ A - \cos\ A$, prove that

$$\left(\frac{x-y}{x+y}\right)^2 + \left(\frac{x-y}{2}\right)^2 = 1$$

Answers

1. $\sin\ \theta = \frac{a^2-b^2}{a^2+b^2}, \cos\ \theta = \frac{2ab}{a^2+b^2}, \tan\ \theta = \frac{a^2-b^2}{2ab}, \operatorname{cosec}\ \theta = \frac{a^2+b^2}{a^2-b^2}, \sec\ \theta = \frac{a^2+b^2}{2ab}, \cot\ \theta = \frac{2ab}{a^2-b^2}$
2. $\sin\ A = \frac{15}{17}, \sec\ A = \frac{17}{8}$
3. $\cos\ A = \frac{40}{41}, \tan\ A = \frac{9}{40}$
4. 0
5. 2
6. $\frac{3}{4}$
7. $\frac{3}{7}$
8. $\frac{12}{7}$
9. $\frac{1}{\sqrt{7}}$
10. $\frac{\sqrt{7}}{3}$

12. (i) $\sin\,\theta = \frac{2\sqrt{13}}{13}$

(ii) $\cos\,\theta = \frac{3\sqrt{13}}{13}$

14. (i) $\frac{12}{13}$

(ii) $\frac{13}{5}$

(iii) $\frac{5}{13}$

(iv) $\frac{13}{12}$