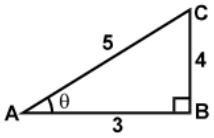
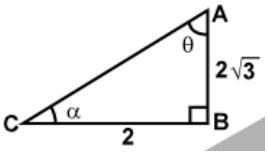
CH – 8 INTRODUCTION TO TRIGONOMETRY

Practice Sheet 1

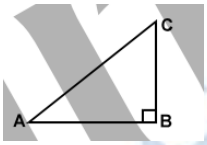
Q1.In the given figure, find the value of cosθ and tanθ



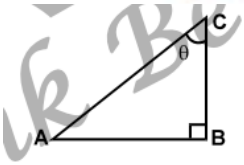
Q2. In the given figure find the value of tanθ and cotα.



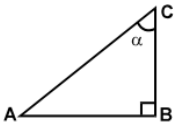
Q3. In the given figure sin A = $\frac{3}{5}$, find the value of cosC and tan A .



Q4. In the given figure cot$\theta = \frac{5}{12}$.Find the value of tan A and secθ.



Q5.In the given figure, tanα = $\sqrt{\frac{7}{8}}$.Find the value of sinα *and* cosec α .



Q6.Given 15cotA = 8 , find SinA and secA.

Q7.In ΔPQR , right angled at Q , PQ = 4cm and RQ = 3cm .Find the values of sinP , sinR ,secP and secR .

Q8.If tan$\theta = \frac{a}{b}$, *find the value of* $\frac{cos\theta + sin\theta}{cos\theta - \sin\theta}$.

Q9.If tan$\theta = \frac{a}{b}$, *prove that* :

(i) $\frac{a\sin\theta - b\cos\theta}{a\sin\theta + b\cos\theta} = \frac{a^2 - b^2}{a^2 + b^2}$ (ii) $\frac{\sin\theta}{\cos\theta} = \frac{a}{b}$

Q10. In ΔABC, ∠ A = θ and ∠ B = 90^0 ; In ΔPQR, ∠ P = α and ∠ Q = 90^0 .If tan$\theta = \frac{1}{3}$ and tan $\alpha = \frac{3}{4}$, find the value of sin$\theta \times \cos\alpha + \cos\theta \times \sin\alpha$

INFINITY THINK BEYOND EDUCATIONAL INSTITUTE

Q11. If tan A = $\sqrt{2}-1$ show that sin A cos A = $\frac{\sqrt{2}}{4}$.

Q12.If sinB = $\frac{1}{2}$ show that : 3 cosB – 4 $\cos^2$B = 0 .

Q13. If sec$\alpha = \frac{5}{4}, verify\ that: \frac{\tan\alpha}{1+tan^2\alpha} = \frac{\sin\alpha}{\sec\alpha}$.

Q14. In ΔOPQ right angled at P, OP = 7cm, OQ – PQ = 1cm. Determine the value of sinQ and cosQ.

Q15. Evaluate each of the following :

(i) $\cos^2 30° + \cos^2 45° + \sin^2 60° + \sin^2 90° + 5$

(ii) $(\text{cosec}^2\ 45°\ \sec^2\ 30°)(\sin^2\ 30° + 4\cot^2\ 45^0)$

(iii) $\frac{\sin 30^0 - sin\ 90^0 + 2\cos 0^0}{\tan 30^0 \tan 60^0} + \frac{\sin 30^0}{\cos 60^0} + \frac{7}{2}$

(iv) $\frac{4}{cot^2 30^0} + \frac{1}{sin^2 60^0} - \frac{cos^2 45^0}{sin^2 60^0} + \frac{1}{2} + \frac{2}{sin^2 45^0}$.

(v) $3(\tan^2\ 30^0 + \cot^2\ 30^0) - 2(\sin^2\ 60 + \cos^2\ 30^0)$

Q16. Find the value of x in each of the following :

(i) $\sqrt{3}\cot x = 3$ (ii) $8\sin^2 (x + 45^0) = 4$ (iii) $2\sin x = \sqrt{3}$

(iv) $\sqrt{3}\tan x = 3$ (v) $8\sin^3 x = 1$ (vi) $3\sqrt{3}\tan^3 3x = 1$

Q17. Verify the following if $\theta = 30^0$.

(i) $\sin 2\theta = \frac{2\tan\theta}{1+tan^2\theta}$ (ii) $\cos 2\theta = 2\cos^2\theta - 1$ (iii) $\cos 3\theta = 4\cos^3\theta - 3\cos\theta$

Q18. If A = 60° and B = 60°, then verify the following :

(i) sin(A – B) = sinA.cosB – cos.sinB

(ii) cos(A – B) = cosA.cosB + sinA.sinB

(iii) tan (A + B) = $\frac{\tan A + \tan B}{1 - \tan A\ .\tan B}$

Q19. If sin(A + B) = 1 and cos(A – B) = 1, 0° < A + B ≤ 90°, find A and B.

Q20. If $\sqrt{3}\tan x = 3$ and $8\sin^3 y = 1$, the find the value of tan(x + y).

Q21. 2sin(A – B) = 1 and 2cos(A + B) = 1, 0 < A + B ≤ 90°, A < B, find A and B.

Q22. Find x and y if $\sqrt{3}\tan(x + y) = 1$ and 2sin (x – y) = 1.

Q23. If $\sqrt{3}\tan 2\theta - 3 = 0$ then find the value θ .

To get more sample papers , practice papers ,study material for Maths (only for CBSE IX-X) join my whatsapp group at link shared below

https://chat.whatsapp.com/HTcfeKqE4wN8075HOehy0t

Practice Sheet 2

EASY

Q24. Express cosθ in terms of sin θ , sec θ ,tan θ , cot θ and cosec θ .

Q25. Express tanθ in terms of sinθ, cosθ, cotθ, secθ, cosecθ.

Q26. Express the ratio of cosA, tanA and secA in terms of sinA.

Q27. Prove the following identities :

(i) $(\sin\theta + \cos\theta)^2 = 1 + 2\sin\theta \times \cos\theta$

(ii) $(\sec\theta + \tan\theta)^2 = 1 + 2\tan^2\theta + 2\tan\theta \times \sec\theta$

(iii) $(\sec\theta - \tan\theta)^2 = 2\sec^2\theta - 1 - 2\tan\theta \times \sec\theta$

(iv) $\sin^2\theta + (1 - \sin^2\theta) = 1$

Q28. Prove that : SecA(1 – sinA)(secA +tanA) = 1

Q29. Prove that : $\tan^2\theta - \sin^2\theta = \tan^2\theta \cdot \sin^2\theta$

(i) $\sec^2\theta + \text{cosec}^2\theta = \sec^2\theta \cdot \text{cosec}^2\theta$

(ii) $\tan\theta + \cot\theta = \sec\theta \cdot \text{cosec}\,\theta$

(iii) $\frac{1-\sin\theta}{1+\sin\theta} = \frac{(1-\sin\theta)^2}{\cos^2\theta} = (\sec\theta - \tan\theta)^2$

(iv) $\sec^4\theta - \tan^4\theta = (2\sec^2\theta - 1) = 1 + 2\tan^2\theta$

(v) $\frac{1}{1-\sin A} + \frac{1}{1+\sin A} = 2\sec^2 A = 2 + 2\tan^2\theta$

(vi) $\tan\theta - cot\theta = \frac{2\sin^2\theta - 1}{\sin\theta \times \cos\theta} = \frac{1 - 2\cos^2\theta}{\sin\theta \cdot \cos\theta}$

(vii) $\frac{\cos\theta}{1+\sin\theta} + \frac{1+\sin\theta}{\cos\theta} = 2\sec\theta = 2\sqrt{1 + \tan^2\theta}$

(viii) $\frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = 2\,\text{cosec}\,\theta = 2\sqrt{1 + \cot^2\theta}$

Q30. Prove that : $\tan^2\theta + \cot^2\theta + 2 = \sec^2\theta\,\text{cosec}^2\theta$

Q31. Prove that : $\sqrt{sec^2\theta + cosec^2\theta} = \tan\theta + \cot\theta$

Q32. Prove that : $\frac{1 - \tan^2\theta}{\cot^2\theta - 1} = \tan^2\theta$

MODERATE

Q33. Prove that : $\sec^6\theta = \tan^6\theta + 3\tan^2\theta\sec^2\theta + 1$.

Q34. Prove that : $\cot^2 A\,\text{cosec}^2 B - \cot^2 B \cdot \text{cosec}^2 A = \cot^2 A - \cot^2 B$

Q35. Prove that : $\frac{sec^2\theta - sin^2\theta}{tan^2\theta} = \text{cosec}^2\theta - cos^2\theta$.

Q36. Prove that : $\frac{tan\,\theta + sin\theta}{tan\,\theta - sin\,\theta} = \frac{sec\,\theta + 1}{sec\,\theta - 1}$

Q37. Prove that : $\frac{tan^3\theta - 1}{tan\,\theta - 1} = sec^2\theta + tan\,\theta$.

Q38. Prove that : $\sin^6\theta + \cos^6\theta = 1 - 3\sin^2\theta \times \cos^2\theta$

Q39. Prove that : $\frac{1}{sec\,\theta + \tan\theta} = \frac{1 - sin\,\theta}{cos\,\theta}$

Q40. Prove that : $\frac{sin\theta}{1 - cos\theta} + \frac{tan\theta}{1 + cos\,\theta} = \sec\theta\,\text{cosec}\,\theta + \cot\theta$

Q41. Prove that : $\frac{tan\,\theta - \cot\theta}{sin\theta\cos\theta} = \sec^2\theta - \text{cosec}^2\theta$.

INFINITY THINK BEYOND..... AN EDUCATIONAL INSTITUTE

Q42. Prove that : $\frac{cot\,\theta}{1+tan\,\theta} = \frac{cot\,\theta - 1}{2 - sec^2\theta}$.

Q43. Prove that : $\sec^4\theta - \sec^2\theta = \tan^4\theta + \tan^2\theta$.

Q44. Prove that : (sec A - cos A) (cot A + tan A) = tan A × sec A.

Q45. Prove the following identities

(i) $\frac{1+\sin\theta - cos^2\theta}{\cos\theta\,(1+\sin\theta)} = \tan\theta$.

(ii) $\sec^6\theta = 1 + \tan^6\theta + 3\tan^2\theta \times \sec^2\theta$

(iii) $\frac{1}{1-\sin\theta} = \sec^2\theta + \tan\theta \times \sec\theta$

(iv) $\frac{\sec\theta - \tan\theta}{sec\,\theta + \tan\theta} = (\sec\theta - \tan\theta)^2 = \left(\frac{1-\sin\theta}{\cos\theta}\right)^2$.

(v) $\frac{cosec\,\theta - \cot\theta}{cosec\,\theta + \cot\theta} = 1 + \cot^2\theta - 2\,cosec\theta\cot\theta$

(vi) $\frac{\sin\theta}{1-\cos\theta} + \frac{\sin\theta}{1+\cos\theta} = 2\,cosec\,\theta$

(vii) $\frac{1}{sec\theta - \tan\theta} = \frac{\sec\theta + \tan\theta}{sec^2\theta - tan^2\theta}$

(viii) $\frac{1}{cosec\,\theta - \cot\theta} + \frac{1}{cosec\,\theta + \cot\theta} = 2\,\text{cosec}\,\theta$

TOUGH

Q46. Prove that : $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \frac{1}{\sec\theta - \tan\theta}$

Q47. Prove that : $\cos^2\left(\frac{\sec A - 1}{1+\sin A}\right) + \sec^2\left(\frac{\sec A - 1}{1+\sec A}\right) = 0$

Q48. Prove that : $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} + \frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta} = \frac{2}{1-2cos^2\theta} = \frac{2}{2sin^2\theta - 1}$.

Q49. Prove that : (cosec A - sin A) (sec A - cos A) (tan A + cot A) = 1

Q50. Prove that : $\frac{tan\theta - \cot\theta}{sin\theta\,\cos\theta} = sec^2\theta - cosec^2\theta$

Q51. Prove that : $\frac{\cos A}{1-\tan A} + \frac{\sin A}{1-\cot A}$ = Cos A + sin A ..

Q52. Prove that : $\frac{1}{cosec\,A - \cot A} - \frac{1}{\sin A} = \frac{1}{\sin A} - \frac{1}{cosec\,A + \cot A}$

Q53. Prove that : $\frac{\cot A + cosec\,A - 1}{\cot A - Cosec\,A + 1} = \frac{1+\cos A}{\sin A}$.

Q54. Prove that : $\frac{\tan A}{Sec\,A - 1} + \frac{\tan A}{Sec\,A + 1}$ = 2 Cosec A

Q55. Prove that : $(\sin\theta + \sec\theta)^2 + (\cos\theta + \text{cosec}\,\theta)^2 = (1 + \sec\theta \times \text{cosec}\,\theta)^2$

Q56. If x = a cosθ - b sinθ and y = asinθ + bcosθ, prove that $x^2 + y^2 = a^2 + b^2$

Q57. If x = acos θ and y = bcot θ , prove that $\frac{a^2}{x^2} - \frac{b^2}{y^2} = 1$.

Q58. tan θ + sin θ = m and tan θ – sin θ = n, show that $m^2 - n^2 = 4\sqrt{mm}$.

Q59. Prove the following identities :

(i) $\frac{1}{sec\theta - \tan\theta} + \frac{1}{\sec\theta + \tan\theta} = 2\sec\theta$

(ii) $\frac{(1+cot^2\theta) \times \tan\theta}{sec^2\theta} = \cot\theta$ ($\therefore 1 + \cot^2\theta = \text{cosec}^2\theta$)

(iii) (1 + $\tan^2\theta$) (1 + $\cot^2\theta$)

To get more sample papers , practice papers ,study material for Maths (only for CBSE IX-X) join my whatsapp group at link shared below

https://chat.whatsapp.com/HTcfeKqE4wN8075HOehy0t

ADDITIONAL QUESTIONS

Q60. If cosA cos 30 =$\frac{\sqrt{3}}{4}$, then find the measure of A .

Q61. If 2 sin 2x =$\sqrt{3}$, then find the value of x.

Q62. If sin30 = x and cos60 = y , then find $x^2 + y^2$.

Q63.If 4tanθ = 3 , then find $\left(\frac{4\sin\theta-\cos\theta}{4\sin\theta+\cos\theta}\right)$.

Q64. If cot$\theta = 2$, then find the value of $\frac{4\sin\theta-3\cos\theta}{2\sin\theta+6\cos\theta}$.

Q65. If tan(3x + 30°) = 1 then find the value of x.

Q66. If sin α= $\frac{1}{2}$ and cos β= $\frac{1}{2}$, then find the value of (α + β) .

Q67.If 1 + $\sin^2\theta$ = 3 sinθ cos θ , prove that tan $\theta = 1 \; or \frac{1}{2}$.

Q68. Find the value of 8 sin 2x cos 4x sin 6x when x = 15^0.

Q69. If secθ - tan$\theta = \frac{4}{5}$, find the value of cosec θ .

Q70. If 21 cosecθ = 29, find all the trigonometric ratios.

Q71. Tan $\alpha = -\sqrt{3}$ and tan $\beta = \frac{1}{\sqrt{3}} < \alpha, \beta < 90^0$, find the value of cot ($\alpha + \beta$) .

Q72. If tan θ = $\frac{1}{\sqrt{7}}$ then show that $\frac{cosec^2\theta - sec^2\theta}{cosec^2\theta + sec^2\theta} = \frac{3}{4}$.

Q73. Prove that $\frac{(\cos A - \sin A + 1)}{(\cos A + \sin A - 1)}$= cosec A + cot A , using the identity $cosec^2A = 1 + cot^2 A$.

Q74. Prove that $\sqrt{\frac{Sec\ A-1}{sec\ A+1}} + \sqrt{\frac{Sec\ A+1}{sec\ A-1}}$ = 2 cosec A .

Q75.Evaluate :$\frac{tan^260^0+4cos^245^0+3\,sec^230^0+5}{cosec^230^0+sec\ 60^0-cot^230^0}$.

Q76. If sinθ – cosθ = 0 then show that: ($\sin^4\theta$ - $\cos^4\theta$) = 0

Q77. If sin (A + B) = 1 and cos (A - B) = $\frac{\sqrt{3}}{2}$, , $find\ 'A'\ and\ 'B'$.

Q78. If tan θ = $\frac{3}{4}$, evaluate : $\frac{2\sin\theta\cos\theta}{cos^2\theta-sin^2\theta}$.

Q79. Prove that $\sqrt{\frac{1+cos\theta}{1-cos\theta}}$ = cosec $\theta + cot\ \theta$.

Q80. If sinθ + $\sin^2\theta$ = 1 then prove that $\cos^2\theta$ + $\cos^4\theta$ = 1.

Q81. Prove that $\frac{tan\ A}{1+secA}$ - $\frac{tan\ A}{1-secA}$ = 2 cosec A

Q82. If secθ = x + $\frac{1}{4x}$, $prove\ that\ sec\theta + tan\theta = 2x\ or \frac{1}{2x}$.

To get more sample papers , practice papers ,study material for Maths (only for CBSE IX-X) join my whatsapp group at link shared below

https://chat.whatsapp.com/HTcfeKqE4wN8075HOehy0t