TRIGONOMETRY- 2

CLASS X (2025-26)

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1 If $\sin\theta = \cos\theta$, then the value of θ is _____. $(0° \le \theta \le 90°)$

2 If $\operatorname{cosec}\theta - \cot\theta = \frac{1}{3}$ the value of $(\operatorname{cosec}\theta + \cot\theta)$ is _____.

A) 1 B) 2 C) 3 D) 0

3 If $\tan A = \frac{5}{12}$, find the value of $(\sin A + \cos A).\sec A$.

(a) $\frac{13}{12}$ (b) $\frac{17}{12}$ (c) $\frac{12}{17}$ (d) $\frac{12}{13}$

4 If $\tan(A+B) = \sqrt{3}$ *and* $\tan(A-B) = \frac{1}{\sqrt{3}}$, $0° < A+B \le 90°$, $A > B$. A and B are ____ and __.

5 $4\cot^2 45° - \sec^2 60° + \sin^2 60° + \cos^2 90° =$ _____.

6 If $\sec^2\theta(1+\sin\theta)(1-\sin\theta) = k$, then find the value of k is _____.

7 The value of $\frac{1}{5}\sec^2 A - \frac{1}{5}\tan^2 A$ = _____.

A) 5 B) 9 C) $\frac{1}{5}$ D) 0

8 If $5\tan\theta = 4$, evaluate $\frac{5\sin\theta - 3\cos\theta}{5\sin\theta + 2\cos\theta}$

9 Find the value of x , *if* $\tan 3x = \sin 45° \cdot \cos 45° + \sin 30°$.

10 In Δ ABC, right angled at B, AB = 5 cm and $\sin C = \frac{1}{2}$. Determine the length of side AC

11 If $\sec\theta = \frac{25}{7}$, find the values of tan θ and cosec θ.

12 In Δ ABC, right angle at B, if AB = 12 cm and BC = 5 cm, find

(i) sin A and tan A, (ii) sin C and cot C.

13 Given A = 30°, verify sin 2A = 2 sin A cos A.

14 If $\tan\theta = \frac{1}{\sqrt{3}}$, $(0° \le \theta \le 90°)$ then evaluate $\frac{\operatorname{cosec}^2\theta - \sec^2\theta}{\operatorname{cosec}^2\theta + \sec^2\theta}$

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

16 Simplified form of $(1 + \tan^2\theta)(1 - \sin\theta)(1 + \sin\theta)$ is _____.

A) 1 B) $\frac{1}{2}$ C) $\cot^2\theta$ D) $\tan^2\theta$

17 Find the value of x if $\cos 2x = \sin 60° \cdot \cos 30° - \cos 60° \cdot \sin 30°$.

A) 60° B) 36° C) 27° D) 30°

18 The value of $\frac{1-\sin 60°}{\cos 60°} =$ _____

19 If $\sec\theta - \tan\theta = \frac{1}{2}$ the value of $(\sec\theta + \tan\theta)$ is _____.

20 If $\tan A = \frac{5}{12}$, find the value of (sin A + cos A) . sec A.

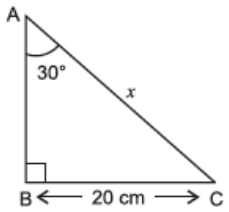
21 If $cot\ \theta = \frac{7}{8}$ evaluate $\frac{(1+sin\theta)(1-sin\theta)}{(1+cos\theta)(1-cos\theta)}$

22 If $\sin\theta = \frac{1}{3}$, then find the value of $(2\cot^2\theta + 2)$

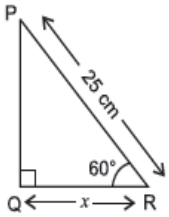
23 If $3x = \text{cosec}\ \theta$ and $\frac{3}{x} = \cot\theta$, find the value of $3\left(x^2 - \frac{1}{x^2}\right)$

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

25 Find the value of *x* from the figure.



26 Find the value of *x* from the figure.



27 Evaluate: $3\cot^2 60° + \sec^2 45°$

28 If $\sin A = \frac{\sqrt{3}}{2}$ find the value of $2\cot^2 A - 1$.

29 If $cos\ (40° + x) = sin\ 30°$, find the value of *x*.

30 By taking $A = 30°$, evaluate $4cos^3A - 3cosA$

31 If $tanx = sin45°\cos 45° + sin30°$ then $x =$ _____.

32 If $A = 60°\ and\ B = 30°$, verify that $\sin(A+B) = sinA\ cosB + cosA\ sinB$

33 If $a\cos\theta - b\sin\theta = x$ and $a\sin\theta + b\cos\theta = y$. Prove that $a^2 + b^2 = x^2 + y^2$.

34 Prove that : $\frac{sin\theta + cos\theta}{sin\theta - cos\theta} + \frac{sin\theta - cos\theta}{sin\theta + cos\theta} = \frac{2\ sec^2\theta}{tan^2\theta - 1}$

35 Prove that : $\frac{cosA}{1+sinA} + \frac{1+sinA}{cosA} = 2\ secA$

36 The value of $\frac{1}{2}\sin^2 A + \frac{1}{2}\cos^2 A =$ _____.

37 If $\tan(A+B) = \sqrt{3}$, $\tan(A-B) = \frac{1}{\sqrt{3}}$, $0 < A + B < 90$, $A > B$, find A and B.

38 If $\sec^2\theta\ (1 + \sin\theta)\ (1 - \sin\theta) = k$, then find the value of *k*.

39 If $6x = \sec\theta$ and $\frac{6}{x} = \tan\theta$, find the value of $9\left(x^2 - \frac{1}{x^2}\right)$

40 If $3\tan\theta = 4$, evaluate $\frac{5\sin\theta - 3\cos\theta}{5sin\theta + 2\cos\theta}$

41 In a triangle ABC, right angled at B, the ratio of AB to AC is $1 : \sqrt{2}$. Find the value of $\frac{2tanA}{1+tan^2A}$

42 If $A = 60°\ and\ B = 30°$, verify that: $sin\ (A - B) = sin\ A\ cos\ B - cos\ A\ sin\ B$.

43 If $7sin^2\theta + 3cos^2\theta = 4$, then show that $tan\theta = \frac{1}{\sqrt{3}}$

44 If $\sin\theta = \frac{m}{n}$, find the value of $\frac{tan\theta+4}{4cot\theta+1}$

45 Prove that : $(1 + cot\theta - cosec\theta)(1 + tan\theta + sec\theta) = 2$

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

47 Prove that: $\frac{1}{(secx-tanx)} - \frac{1}{cosx} = \frac{1}{cosx} - \frac{1}{(secx+tanx)}$

48 Evaluate : $4\cot^2 45° - \sec^2 60° + \sin^2 60° + \cos^2 90°$.

49 Find the value of x if $tan\ 3x = sin\ 45°.cos\ 45° + sin\ 30°$.

50 Taking $A = 30°$, $verify\ that\ cos3A = 4cos^3A - 3cosA$

51 Prove that: $\frac{cot\theta+cosec\theta-1}{cot\theta-cosec\theta+1} = \frac{1+cos\theta}{sin\theta}$

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

53 Prove that: $sin^4\theta + cos^4\theta = 1 - 2sin^2\theta\ cos^2\theta$.

54 Simplify: $(1 + \tan^2\theta)(1 - \sin\theta)(1 + \sin\theta)$.

55 If $\sec\theta + \tan\theta = m$ and $\sec\theta - \tan\theta = n$, find the value of $\sqrt{mn}$.

56 If $sin\ \theta + cos\ \theta = p\ and\ sec\ \theta + cosec\ \theta = q$, show that $q(p^2 - 1) = 2p$.

57 Prove the following identity: $\frac{sin\theta}{1-cos\theta} + \frac{tan\theta}{1+cos\theta} = \sec\theta \cdot \text{cosec}\,\theta + \cot\theta$

58 Prove the following identity : $\cos^4 A - \cos^2 A = \sin^4 A - \sin^2 A$

59 Prove the following identity : $\sin^4 A + \cos^4 A = 1 - 2\sin^2 A \cos^2 A$

60 Prove that: $\frac{cos\theta}{1-sin\theta} = \frac{1+sin\theta}{cos\theta}$

61 Prove the following identity: If $cos\ \theta - sin\ \theta = 1, show\ that\ cos\ \theta + sin\ \theta = 1\ or - 1$.

62 If $a\cos\theta - b\sin\theta = x$ and $a\sin\theta + b\cos\theta = y$. Prove that $a^2 + b^2 = x^2 + y^2$.

63 If $A = 60°\ and\ \ B = 30°$, verify that $cos\ (A - B) = cos\ A\ cos\ B + sin\ A\ sin\ B$.

64 Determine the value of x such that $2\,\text{cosec}^2 30° + x\sin^2 60° - \frac{3}{4}\tan^2 30° = 10$

65 If $6x = sec\theta\ and\ \frac{6}{x} = tan\theta, find\ the\ value\ of\ 9\left(x^2 - \frac{1}{x^2}\right)$

66 Prove that $(cosec\theta - \cot\theta)^2 = \frac{1-cos\theta}{1+cos\theta}$

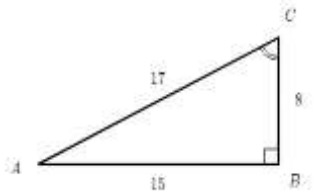
67 If $x = acos\theta + bsin\theta, \quad y = asin\theta - b\ cos\theta$, prove that $x^2 + y^2 = a^2 + b^2$

68 Prove that: $\frac{tanA}{secA-1} + \frac{tanA}{secA+1} = 2\ cosec\ A$.

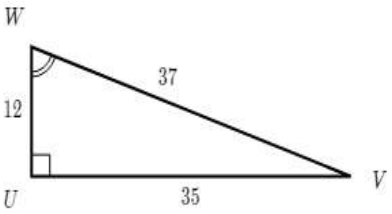
69 If $2\cos\theta - \sin\theta = x$ and $\cos\theta - 3\sin\theta = y$, prove that $2x^2 + y^2 - 2xy = 5$.

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

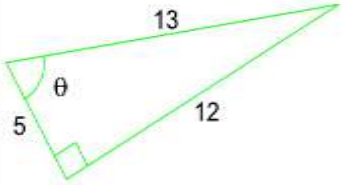
71 Find $sinC$, $\cos C$



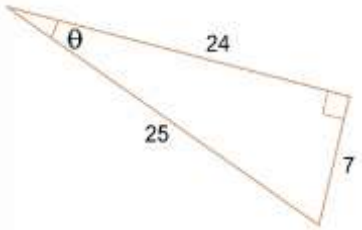
72 Find $sinW$, $tanW$



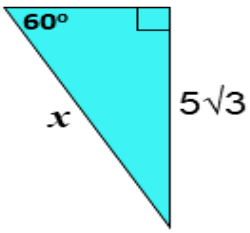
73 Find $\tan\theta$, $cos\theta$

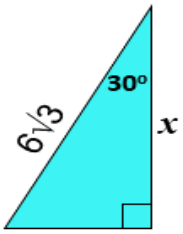


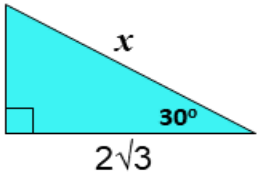
74 Find $\sec\theta$, $cosec\theta$

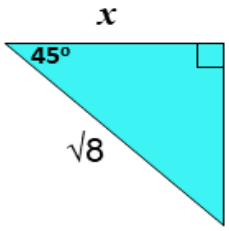


75 Find x









76 Taking $A = 30°$, $verify\ that$ i) $sin2A = 2sinAcosA$ ii) $cos2A = 2cos^2A - 1$

iii) $sin3A = 3sinA - 4sin^3A$ iv) $tan2A = \frac{2tanA}{1-tan^2A}$ v) $cos3A = 4cos^3A - 3cosA$

77 1. $If\ A = 60°\ and\ B = 30°, verify\ that$

i) $\sin(A+B) = sinA\ cosB + cosA\ sinB$ (Ans: 1)

ii) $\cos(A+B) = cosA\ cosB - sinA\ sinB$ (Ans: 0)

iii) $\tan(A-B) = \frac{tanA-tanB}{1+tanAtanB}$ (Ans: $\frac{1}{\sqrt{3}}$