CBSE

INTRODUCTION TO TRIGONOMETRY WS 6

Class 10 - Mathematics

1. Find the value of x (in degree) in cos x = cos 60^o cos 30^o + sin 60^o sin 30^o. **[2]**
2. If tan $\frac{5\theta}{2} = \sqrt{3}$ and θ is acute, then find the value of 2θ in terms of degree measures. **[2]**
3. Evaluate: $\frac{3\tan^2\ 30^\circ\ +\ \tan^2\ 60^\circ\ + cosec\ 30^\circ\ -\ \tan\ 45^\circ}{\cot^2\ 45^\circ}$. **[2]**
4. Match the following: **[2]**

Column 1	Column 2
(a) cot(60^o)	(i) $\frac{\sqrt{3}}{2}$
(b) sin(60^o)	(ii) $\frac{2}{\sqrt{3}}$
(c) cos(60^o)	(iii) $\frac{1}{2}$
(d) cosec(60^o)	(iv) $\frac{1}{\sqrt{3}}$

5. Match the following: **[2]**

(a) $\frac{sin\ 30^\circ}{sec\ 0^\circ}$	(i) 1
(b) $\frac{sin\ 30^\circ}{tan\ 0^\circ}$	(ii) 0
(c) $\frac{cot\ 30^\circ}{cot\ 0^\circ}$	(iii) $\frac{1}{2}$
(d) $\frac{2\ cot\ 60^\circ}{cosec\ 60^\circ}$	(iv) Not Defined

6. Match the following: **[2]**

(a) $tan(3D + 30^\circ) = 1$	(i) 10°
(b) $sin(90^\circ - 2A) = sin\ (A - 15^\circ)$	(ii) 35°
(c) $sin\ 2B\ =\ 2\ sin\ B$	(iii) 5°
(d) $tan\ 2C = cot\ (C + 60^\circ)$	(iv) 0°

7. Match the following: **[2]**

(a) $2\ sin\ 60^\circ$	(i) 3
(b) $\sqrt{3}\ cot\ 30^\circ$	(ii) 2
(c) $sec\ 60^\circ$	(iii) $\sqrt{3}$
(d) $\sqrt{2}\ cos\ 45^\circ$	(iv) 1

8. Match the following: **[2]**

(a) $\frac{sin\ 30^\circ}{sin\ 60^\circ}$	(i) 1
(b) $\frac{cos\ (90^\circ - 30^\circ)}{sin\ 30^\circ}$	(ii) 2
(c) $\frac{cosec\ 30^\circ}{cosec\ 60^\circ}$	(iii) $\frac{1}{\sqrt{3}}$

(d) $sec\ 30^\circ\ .\ cot\ 30^\circ$	(iv) $\sqrt{3}$

9. Evaluate: 4 ($\sin^4 30°$ + $\cos^4 60°$) - $\frac{2}{3}$ ($\sin^2 60°$ - $\cos^2 45°$) + $\frac{1}{2}$ $\tan^2 60^o$ **[2]**

10. If θ is a positive acute angle such that $\sec\theta = \cos ec 60^\circ$, find the value of $2\cos^2\theta - 1$. **[2]**

11. Verify: sin 60° cos 30° - cos 60° sin 30° = sin 30° **[2]**

12. Prove that $\frac{\cos 30^\circ + \sin 60^\circ}{1+\sin 30^\circ + \cos 60^\circ} = \cos 30^\circ$. **[2]**

13. Find the value of x if $\cos 2x = \cos 60^\circ \cos 30^\circ + \sin 60^\circ \sin 30^\circ$ **[2]**

14. If $\theta = 30^\circ$, verify that: $\cos 2\theta = \frac{1-\tan^2\theta}{1+\tan^2\theta}$ **[2]**

15. Verify: cos 60° cos 30° + sin 60° sin 30° = cos 30° **[2]**

16. Evaluate $\frac{4}{\cot^2 30^\circ} + \frac{1}{\sin^2 30^\circ}$ - $2\cos^2 45°$ - $\sin^2 0°$. **[2]**

17. If x = 30^o, verify that cos3x= $4\cos^3 x$ - 3cos x. **[2]**

18. If A = 30° and B = 60°, verify that sin (A + B) = sin A cosB + cos A sinB **[2]**

19. If sin (A + B) = 1 and cos (A – B) = 1, find A and B. **[2]**

20. Evaluate ($\sin^2 30°$ + 4 $\cot^2 45°$ - $\sec^2 60°$)($\text{cosec}^2 45°$ $\sec^2 30°$). **[2]**

21. If A = 30° and B = 60°, verify that cos (A + B) = cos A cos B - sin A sinB **[2]**

22. If A = 60° and B = 30°, verify that: cos (A + B) = cos A cos B - sin A sin B **[2]**

23. Find the value of cos 2θ, if 2 sin 2θ= $\sqrt{3}$. **[2]**

24. Using the formula, cos A = $\sqrt{\frac{1+\cos 2A}{2}}$ find the value of cos 30°, it being given that cos 60° = $\frac{1}{2}$ **[2]**

25. In a right triangle ABC, right angled at C, if $\angle B = 60^\circ$ and AB = 15 units. Find the remaining angles and sides. **[2]**

26. If A = B = 60°, verify that $\tan(A - B) = \frac{\tan A - \tan B}{1+\tan A \tan B}$ **[2]**

27. If sin (A + B) = $\frac{\sqrt{3}}{2}$, sin (A - B) = $\frac{1}{2}$, where 0^o < A + B < 90^o; A > B, then find the values of A and B. **[2]**

28. Evaluate: $\frac{2}{3}\left(\cos^4 30^\circ - \sin^4 45^\circ\right) - 3\left(\sin^2 60^\circ - \sec^2 45^\circ\right) + \frac{1}{4}\cot^2 30^\circ$ **[2]**

29. If A = 60° and B = 30°, verify that: sin (A + B) = sin A cos B + cos A sin B **[2]**

30. If $\theta = 30^\circ$, verify that: $\sin 2\theta = \frac{2\tan\theta}{1+\tan^2\theta}$ **[2]**

31. Evaluate: $\frac{5\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$ **[2]**

32. Evaluate: $\cot^2 30^\circ - 2\cos^2 30^\circ - \frac{3}{4}\sec^2 45^\circ + \frac{1}{4}cosec^2 30^\circ$ **[2]**

33. If tan A = 1 and sin B = $\frac{1}{\sqrt{2}}$, find the value of cos(A+B) where A and B are both acute angles. **[2]**

34. If θ = 30°, verify that cos2θ = 2 cos $^2\theta$ - 1 = 1 - 2$\sin^2\theta$ **[2]**

35. Find cosec 30° and cos 60° geometrically. **[2]**

36. If A = B = 60°, verify that sin (A - B) = sin A cos B - cos A sinB **[2]**

37. Evaluate : $\frac{3}{2}$ $\tan^2 30^o$ - 2 $\cos^2 90^o$ - $\frac{1}{2}$ $\text{cosec}^2 30^o$ **[2]**

38. Evaluate $\frac{\sin 60^\circ}{\cos^2 45^\circ} - \cot 30^\circ + 15\cos 90^\circ$. **[2]**

39. Find the value of : sin 30°. cos 60° + cos 30°. sin 60°. **[2]**

    Is it equal to sin 90° or cos 90°?

40. Evaluate $\cos 60^\circ \cos 30^\circ + \sin 60^\circ \sin 30^\circ$ **[2]**

41. Evaluate $\frac{\tan^2 60^\circ + 4\sin^2 45^\circ + 3\sec^2 30^\circ + 5\cos^2 90^\circ}{\text{cosec } 30^\circ + \sec 60^\circ - \cot^2 30^\circ}$. **[2]**

42. If cos (A-B) = $\frac{\sqrt{3}}{2}$ and sin (A + B) = $\frac{\sqrt{3}}{2}$, find A and B, where (A + B) and {A- B) are acute angles. **[2]**

43. If A = B = 60°, verify that cos (A - B) = cosA cosB + sin A sinB **[2]**

44. If A = 60° and B = 30°, verify that: tan (A + B) = $\frac{\tan A + \tan B}{1-\tan A \tan B}$ **[2]**

45. Evaluate: 4 - $\frac{\sin 30^\circ + \tan 45^\circ - cosec 60^\circ}{\sec 30^\circ + \cos 60^\circ + \cot 45^\circ}$ **[2]**

46. Verify that, $\cos 60^\circ = \cos^2 30^\circ - \sin^2 30^\circ = \frac{1}{2}$. **[2]**

47. If sin (A + B) = 1 and cos (A - B) = 1, $0° \leq (A + B) \leq 90°$, $A \geq B$ find A and B. **[2]**

48. Evaluate $4 (\sin^4 30° + \cos^4 60°) - \frac{2}{3}(\sin^2 60° - \cos^2 45°) + \frac{1}{2}\tan^2 60°$. **[2]**

49. Prove that: $\left(\sqrt{3}+1\right)$ (3 – cot 30°) = $\tan^3 60° - 2 \tan 60°$ **[2]**

50. Evaluate : $\frac{\cos 45^\circ}{\sec 30^\circ} + \frac{1}{\sec 60^\circ}$. **[2]**

51. Evaluate: $\frac{\cos 45^\circ}{\sec 30^\circ + cosec 30^\circ}$ **[2]**

52. If tan (A + B) = $\sqrt{3}$ and tan (A - B) = $\frac{1}{\sqrt{3}}$; 0° < A + B $\leq$ 90°; A > B, then find A and B. **[2]**

53. Evaluate: $2(\sin^2 45^o + \cot^2 30^o) - 6(\cos^2 45^o - \tan^2 30^o)$ **[2]**

54. If sin (A + B) = 1 and cos (A - B) = $\frac{\sqrt{3}}{2}$, find A and B. **[2]**

55. Using the formula, tan 2A = $\frac{2\tan A}{1-\tan^2 A}$, find the value of tan 60^o, at being given that tan 30^o = $\frac{1}{\sqrt{3}}$. **[2]**

56. Evaluate: $\frac{3\tan^2\ 30^\circ\ +\ \tan^2\ 60^\circ\ + cosec\ 30^\circ\ -\ \tan\ 45^\circ}{\cot^2\ 45^\circ}$. **[2]**

57. If A = 30°, verify that: sin 2A = $\frac{2\tan A}{1+\tan^2 A}$ **[2]**

58. Evaluate: $2\cos^2 60° + 3\sin^2 45° - 3\sin^2 30° + 2\cos^2 90°$ **[2]**

59. Simplify: $\frac{\sin 30^\circ + \tan 45^\circ - \text{cosec } 60^\circ}{\sec 30^\circ + \cos 60^\circ + \cot 45^\circ}$ **[2]**

60. Evaluate $2\sin^2 30^\circ \tan 60^\circ - 3\cos^2 60^\circ \sec^2 30^\circ$. **[2]**

61. Using the formula, cos A = $\sqrt{\frac{1-\cos 2A}{2}}$ find the value of cos 30°, it being given that cos 60° = $\frac{1}{2}$ **[2]**

62. Verify 2 sin 30° cos 30° = sin 60° **[2]**

63. If tan (A + B) = $\sqrt{3}$ and tan (A - B) = 1, 0°< (A + B) < 90° and A > B then find A and B. **[2]**

64. Evaluate: sin 60° cos 30° + sin 30° cos 60° **[2]**

65. Find the value of x in $\sin 2x = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$. **[2]**

66. Evaluate $\sin 60^\circ \cos 45^\circ + \cos 60^\circ \sin 45^\circ$ in the simplest form. **[2]**

67. If $\theta = 30^\circ$, verify that $\tan 2\theta = \frac{2\tan\theta}{1-\tan^2\theta}$ **[2]**

68. Evaluate $\cos ec^2 30^\circ \sin^2 45^\circ - \sec^2 60^\circ$ **[2]**

69. If A = 45°, verify that: cos 2A = $2\cos^2 A - 1 = 1 - 2\sin^2 A$ **[2]**

70. Verify that, $\cos 60^\circ = \frac{1-\tan^2 30^\circ}{1+\tan^2 30^\circ} = \frac{1}{2}$. **[2]**

71. If tan A $= \frac{1}{2}$ and tan B $= \frac{1}{3}$, using tan (A + B) $= \frac{\tan A+\tan B}{1-\tan A\tan B}$, prove that A + B = 45°. **[2]**

72. If A = 30°, verify that: cos 2A = $\frac{1-\tan^2 A}{1+\tan^2 A}$ **[2]**

73. If A = 45°, verify that: sin 2A = 2 sin A cos A **[2]**

74. Evaluate: $\tan^2 60^o - 2\,\text{cosec}^2 30^o - 2\tan^2 30^o$. **[2]**

75. If sin (A + B) = 1 and sin (A -B) = $\frac{1}{2}$, 0$\leq$A + B = 90° and A > B, then find A and B. **[2]**