

Subject – Maths.

Class- 10th

Topic – Ch. 6 Trigonometric Ratios

Solve the following exercise

EXERCISE 6.1

Find the values of the following :

1. $2 \sin 45^\circ \cdot \cos 45^\circ$

2. $\cos 45^\circ \cos 60^\circ - \sin 45^\circ \sin 60^\circ$

3. $\sin^2 30^\circ + 2 \cos^2 45^\circ + 3 \tan^2 60^\circ$

4. $3 \sin 60^\circ - 4 \sin^3 60^\circ$

5.
$$\frac{5 \cos^2 60^\circ + 4 \sin^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 45^\circ}$$

6. $4 \cot^2 45^\circ - \sec^2 60^\circ + \sin^2 60^\circ + \cos^2 90^\circ$

7.
$$\frac{4}{\cot^2 30^\circ} + \frac{1}{\sin^2 30^\circ} - \cos^2 45^\circ$$

8.
$$\frac{\tan^2 60^\circ + 4 \sin^2 45^\circ + \sin^2 90^\circ}{3 \sec^2 30^\circ + \operatorname{cosec}^2 60^\circ - \cot^2 30^\circ}$$

9.
$$\frac{\sin 30^\circ - \sin 90^\circ + 2 \cos 0^\circ}{\tan 30^\circ \cdot \tan 60^\circ}$$

10.
$$\frac{2 \tan 30^\circ}{1 - \tan^2 30^\circ}$$

11. Find the value of x in the following :

(i) $\cos x = \cos 60^\circ \cos 30^\circ + \sin 60^\circ \sin 30^\circ$

(ii) $\sin 2x = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$

(iii) $\sqrt{3} \tan 2x = \sin 30^\circ + \sin 45^\circ \cos 45^\circ + 2 \sin 90^\circ$

Prove that :

12. $\frac{\cos 30^\circ + \sin 60^\circ}{1 + \cos 60^\circ + \sin 30^\circ} = \frac{\sqrt{3}}{2}$

13. $4 \cot^2 45^\circ - \sec^2 60^\circ - \sin^2 30^\circ = -\frac{1}{4}$

14. $\sin 30^\circ \sin^2 60^\circ + 3 \cos 60^\circ \tan 45^\circ =$
 $2 \sec^2 45^\circ - \operatorname{cosec}^2 90^\circ$

15. $\operatorname{cosec}^2 45^\circ \cdot \sec^2 30^\circ \sin^3 90^\circ \cos 60^\circ = \frac{4}{3}$

16. $\frac{\sin 60^\circ + \sin 30^\circ}{\sin 60^\circ - \sin 30^\circ} = \frac{\tan 60^\circ + \tan 45^\circ}{\tan 60^\circ - \tan 45^\circ}$

17. $2(\cos^2 45^\circ + \tan^2 60^\circ) - 6(\sin^2 45^\circ - \tan 30^\circ) = 6$

18. $(\sec^2 30^\circ + \operatorname{cosec}^2 45^\circ) (2 \cos 60^\circ + \sin 90^\circ +$
 $\tan 45^\circ) = 10$

19. $(1 - \sin 45^\circ + \sin 30^\circ)(1 + \cos 45^\circ + \cos 60^\circ) = \frac{7}{4}$

20. $\cos^2 0^\circ - 2 \cot^2 30^\circ + 3 \operatorname{cosec}^2 90^\circ =$
 $2(\sec^2 45^\circ - \tan^2 60^\circ)$

21. If $x = 30^\circ$, then prove that

(i) $\sin 3x = 3 \sin x - 4 \sin^3 x$

(ii) $\tan 2x = \frac{2 \tan x}{1 - \tan^2 x}$

(iii) $\sin x = \sqrt{\frac{1 - \cos 2x}{2}}$

(iv) $\cos 3x = 4 \cos^3 x - 3 \cos x$