

TRIGONOMETRY

WORKSHEET-1

I. Introduce all the six trigonometric ratio:

$$\sin \theta, \cos \theta, \tan \theta, \cot \theta, \sec \theta, \operatorname{cosec} \theta$$

II. Introduce the reciprocal of the trigonometric ratios:

$$\sin \theta = \frac{1}{\operatorname{cosec} \theta}$$

$$\operatorname{cosec} \theta = \frac{1}{\sin \theta}$$

$$\cos \theta = \frac{1}{\sec \theta}$$

$$\sec \theta = \frac{1}{\cos \theta}$$

$$\tan \theta = \frac{1}{\cot \theta}$$

$$\cot \theta = \frac{1}{\tan \theta}$$

PRACTICE

1. If $\sin \theta = \frac{1}{2}$, $\operatorname{cosec} \theta = ?$

2. If $\tan \theta = \frac{1}{\sqrt{3}}$, $\cot \theta = ?$

3. If $\cos \theta = \frac{\sqrt{3}}{2}$, $\sec \theta = ?$

4. If $\cot \theta = \frac{1}{\sqrt{3}}$, $\tan \theta = ?$

5. If $\operatorname{cosec} \theta = \sqrt{2}$, $\sin \theta = ?$

6. If $\sin \theta = \frac{\sqrt{3}}{2}$, $\operatorname{cosec} \theta = ?$

7. If $\sec \theta = 2$, $\cos \theta = ?$

8. If $\cos \theta = 1$, $\sec \theta = ?$

9. If $\tan \theta = 1$, $\cot \theta = ?$

10. If $\cot \theta = \sqrt{3}$, $\tan \theta = ?$

WORKSHEET-2

III. Introduce complementary angles:

$$30^{\circ} \rightarrow 90^{\circ} - 30^{\circ} = 60^{\circ}$$

Practice using calculator:

Write the complementary angles of the following angles:

1. $30^{\circ} \rightarrow 90^{\circ} - 30^{\circ} = 60^{\circ}$

2. $45^{\circ} \rightarrow$

3. $60^{\circ} \rightarrow$

4. $40^{\circ} \rightarrow$

5. $50^{\circ} \rightarrow$

6. $75^{\circ} \rightarrow$

7. $18^{\circ} \rightarrow$

8. $53^{\circ} \rightarrow$

9. $20^{\circ} \rightarrow$

10. $54^{\circ} \rightarrow$

11. $38^{\circ} \rightarrow$

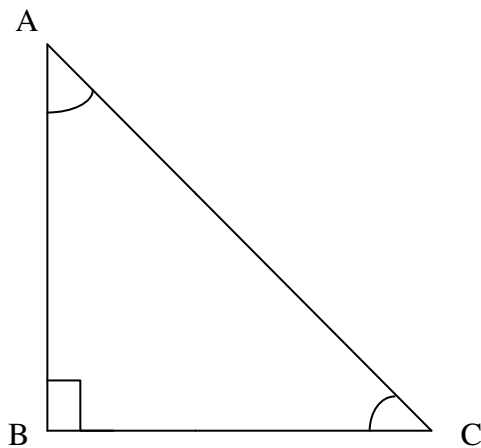
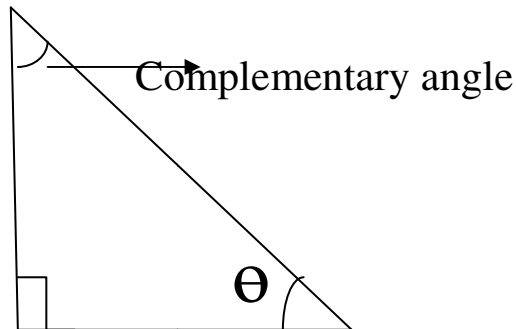
12. $22^{\circ} \rightarrow$

13. $10^{\circ} \rightarrow$

14. $68^{\circ} \rightarrow$

15. $43^{\circ} \rightarrow$

IV. Explain the complementary angle of the right angled triangle.



$$\angle A + \angle C = 90^\circ$$

Explain

$$\sin \theta \rightarrow \text{co-sine} \rightarrow \cos(90^\circ - \theta)$$

$$\sec \theta \rightarrow \text{co-sec} \rightarrow \text{cosec}(90^\circ - \theta)$$

$$\tan \theta \rightarrow \text{co-tan} \rightarrow \cot(90^\circ - \theta)$$

$$\cos \theta \rightarrow \text{cosec} \rightarrow \sin(90^\circ - \theta)$$

$$\text{cosec} \theta \rightarrow \sec(90^\circ - \theta)$$

$$\cot \theta \rightarrow \tan(90^\circ - \theta)$$

WORKSHEET-3

Convert in respective complementary angles:

1. $\sin 20^\circ = \cos (90^\circ - 20^\circ) = \cos 70^\circ$

2. $\tan 30^\circ = \cot (90^\circ - 30^\circ) = \cot 60^\circ$

Convert in respective complementary angles

1. $\sin 40^\circ = ?$

2. $\sin 30^\circ = ?$

3. $\sin 45^\circ = ?$

4. $\sin 22^\circ = ?$

5. $\sin 90^\circ = ?$

6. $\cos 30^\circ = ?$

7. $\cos 50^\circ = ?$

8. $\cos 68^\circ = ?$

9. $\cos 53^\circ = ?$

10. $\cos 45^\circ = ?$

11. $\tan 40^\circ = ?$

12. $\tan 30^\circ = ?$

13. $\tan 45^\circ = ?$

14. $\tan 54^\circ = ?$

15. $\tan 75^\circ = ?$

16. $\cot 18^\circ = ?$

17. $\cot 50^\circ = ?$

18. $\cot 80^\circ = ?$

19. $\cot 10^\circ = ?$

20. $\cot 43^\circ = ?$

21. $\sec 47^\circ = ?$

22. $\sec 30^\circ = ?$

23. $\sec 45^\circ = ?$

24. $\sec 60^\circ = ?$

25. $\sec 90^\circ = ?$

26. $\operatorname{cosec} 36^\circ = ?$

27. $\operatorname{cosec} 50^\circ = ?$

28. $\operatorname{cosec} 52^\circ = ?$

29. $\operatorname{cosec} 10^\circ = ?$

30. $\operatorname{cosec} 45^\circ = ?$

Find the values of the following:

1. $\frac{\sin 50^\circ}{\cos 40^\circ}$

2. $\frac{\sin 40^\circ}{\cos 50^\circ}$

3. $\cos 52^\circ \operatorname{cosec} 38^\circ$

4. $\frac{\sin 70^\circ}{\cos 20^\circ}$

5. $\frac{\operatorname{cosec} 36^\circ}{\sec 54^\circ}$

6. $\tan 10^\circ \tan 80^\circ$

7. $\tan 20^\circ \tan 70^\circ$

8. $\tan 10^\circ \tan 40^\circ \tan 50^\circ \tan 80^\circ$

9. $\cos 43^\circ \operatorname{cosec} 47^\circ$

10. $\sin 35^\circ \sec 55^\circ$

11. $\frac{\cos 20^\circ}{\sin 70^\circ}$

12. $\frac{\cot 15^\circ}{\tan 75^\circ}$

13. $\tan 5^\circ \tan 25^\circ \tan 65^\circ \tan 85^\circ$

14. $\frac{\sin 50^\circ}{\cos 40^\circ} + \frac{\sin 40^\circ}{\cos 50^\circ}$

15. $\frac{\sin 50^\circ}{\cos 40^\circ} + \frac{\sin 40^\circ}{\cos 50^\circ} - \cos 52^\circ \operatorname{cosec} 38^\circ$

(TBSE-2009)

16. $\frac{\sin 70^\circ}{\cos 20^\circ} + \frac{\operatorname{cosec} 36^\circ}{\sec 54^\circ} - 2\cos 43^\circ \operatorname{cosec} 47^\circ$

17. $\frac{\cos 20^\circ}{\sin 70^\circ} + \frac{\cot 15^\circ}{\tan 75^\circ} - \frac{2 \cos 43^\circ \operatorname{cosec} 47^\circ}{\tan 10^\circ \tan 40^\circ \tan 50^\circ \tan 80^\circ}$

(TBSE-2011)

18. $\frac{2\sin 68^\circ}{\cos 22^\circ} - \frac{2\cot 15^\circ}{5\tan 75^\circ} - \frac{3 \tan 20^\circ \tan 40^\circ \tan 50^\circ \tan 70^\circ}{5}$

(TBSE-2013)

19. $\frac{\cos 20^\circ}{\sin 70^\circ} + \frac{\sin 35^\circ \sec 55^\circ}{\tan 5^\circ \tan 25^\circ \tan 65^\circ \tan 85^\circ}$

(TBSE-2014)

20. If $\sin(3x - 20^\circ) = \cos(3y + 20^\circ)$, find the value of $\sin(x + y)$ (TBSE-2010)

21. If $\sin x = \cos y$, & $\tan(x - 30^\circ) = \cot(60^\circ - y)$, find x and y . (TBSE-2012)

WORKSHEET-4

IV. INTRODUCE THE TABLE

θ	0°	30°	45°	60°	90°
$\sin \theta$	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
$\cos \theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
$\tan \theta$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	∞
$\cot \theta$	∞	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0
$\sec \theta$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	∞
$\operatorname{cosec} \theta$	∞	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1

PRACTICE

Find the values of the following using table

1. $\sin 30^\circ = ?$

2. $\sin 60^\circ = ?$

3. $\cos 45^\circ = ?$

4. $\operatorname{cosec} 60^\circ = ?$

5. $\sin 90^\circ = ?$

6. $\cos 30^\circ = ?$

7. $\cot 45^\circ = ?$

8. $\sec 60^\circ = ?$

9. $\sin 0^\circ = ?$

10. $\tan 45^\circ = ?$

1. $\sec 30^\circ = ?$

2. $\tan 30^\circ = ?$

3. $\sin 45^\circ = ?$

4. $\sin 45^\circ = ?$

5. $\sec 90^\circ = ?$

6. $\operatorname{cosec} 30^\circ = ?$

7. $\operatorname{cosec} 90^\circ = ?$

8. $\sec 30^\circ = ?$

9. $\tan 60^\circ = ?$

10. $\tan 0^\circ = ?$

WORKSHEET-5

Find the values of

1. $\sin^2 30^\circ$

2. $\cos^2 60^\circ$

3. $\tan^2 45^\circ$

4. $\cot^2 45^\circ$

5. $\operatorname{cosec}^2 90^\circ$

6. $\sin^2 30^\circ \operatorname{cosec}^2 90^\circ$

7. $\sec 60^\circ + \cos^2 0^\circ$

8. $\sec 45^\circ \sin 30^\circ$

9. $\sin 60^\circ \operatorname{cosec} 30^\circ$

10. $\cot 30^\circ \sin 90^\circ$

11. $\sec^2 60^\circ - \cot^2 30^\circ$

12. $\frac{2 \tan 30^\circ \operatorname{cosec} 60^\circ}{1 + \tan^2 30^\circ}$

13. $\frac{1}{3} \tan^2 60^\circ + 4 \cos^2 30^\circ$

14. $\sec^2 60^\circ - \cot^2 30^\circ - \frac{2 \tan 30^\circ \operatorname{cosec} 60^\circ}{1 + \tan^2 30^\circ}$

(TBSE-2013)

15. $2 \operatorname{cosec}^2 60^\circ - \frac{3}{4} \cot^2 45^\circ$

16. $\sec 30^\circ \tan 60^\circ - \operatorname{cosec}^2 45^\circ + \sin 90^\circ$

17. $\frac{2 \tan 30^\circ \operatorname{cosec} 60^\circ}{1 + \tan^2 30^\circ} - \sec^2 60^\circ + \cot^2 30^\circ$

18. $\frac{3}{4} \tan^2 60^\circ + 3 \cos^2 30^\circ - 2 \operatorname{cosec}^2 60^\circ - \frac{3}{4} \cot^2 45^\circ$ (TBSE-2014)

WORKSHEET-6

Find the value of x

1. $x \sin 30^\circ = \sin 90^\circ$

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

3. $x \cos^2 30^\circ = \tan 45^\circ - \cos^2 60^\circ$

4. $x \operatorname{cosec}^2 90^\circ = \sec 60^\circ + \cos^2 0^\circ$

5. $x \sin 45^\circ \tan 45^\circ \tan 60^\circ = \tan^2 45^\circ - \cos^2 60^\circ$ **(TBSE-2009)**

6. $x^2 \sin^2 30^\circ = \cos^2 0^\circ$

7. $x^2 \sin^2 30^\circ \operatorname{cosec}^2 90^\circ = \sec 60 + \cos^2 0^\circ$ **(TBSE-2010)**

8. $x \sec 45^\circ \sin 30^\circ = \sin 60^\circ \operatorname{cosec} 30^\circ + \cot 30^\circ \sin 90^\circ$ **(TBSE-2011)**

9. $x \cos 30^\circ \cot 60^\circ - \tan^2 45^\circ = \sec 30^\circ \tan 60^\circ - \operatorname{cosec}^2 45^\circ + \sin 90^\circ$ **(TBSE-2012)**

10. $x \sin 60^\circ \cos^2 30^\circ = \frac{\tan^2 60^\circ \sec 60^\circ}{\operatorname{cosec} 60}$ **(TBSE-2015)**

11. If $\sin 43^\circ = \frac{x}{y}$ than show that $\sec 43^\circ - \sin 47^\circ = \frac{x^2}{y\sqrt{(y^2-x^2)}}$ **(TBSE-2015)**

