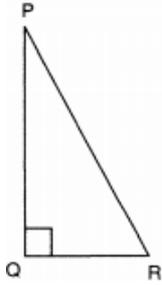


INTRODUCTION TO TRIGONOMETRY WS 2

Class 10 - Mathematics

Section A

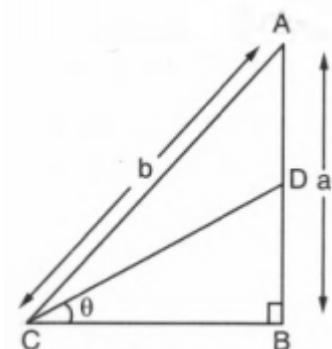
1. Find the value of the trigonometric ratios if: $\tan \alpha = \frac{5}{12}$ [3]
2. If $\tan A = 2$, evaluate $\sec A \sin A + \tan^2 A - \operatorname{cosec} A$ [3]
3. In the given $\triangle PQR$, right-angled at Q, $QR = 9$ cm and $PR - PQ = 1$ cm. Determine the value of $\sin R + \cos R$. [3]



4. In $\triangle ABC$, right-angled at B, $AB = 5$ cm and $BC = 12$ cm. Find the values of $\sin A$, $\sec A$, $\sin C$ and $\sec C$. [3]
5. In $\triangle ABC$, right angled at B, if, $\tan A = \frac{1}{\sqrt{3}}$ Find the value of. [3]
 - i. $\sin A \cos C + \cos A \sin C$
 - ii. $\cos A \cos C - \sin A \sin C$
6. In a $\triangle ABC$ it is given that $\angle B = 90^\circ$ and $AB: AC = 1: \sqrt{2}$. Find the value of $\left(\frac{2 \tan A}{1 + \tan^2 A}\right)$. [3]
7. If $\operatorname{cosec} \theta = \sqrt{10}$, find the value of all T-ratios of θ . [3]
8. If $\tan A = \frac{3}{4}$, then show that $\sin A \cos A = \frac{12}{25}$. [3]
9. If $\sec \theta = \frac{5}{4}$, find the value of $\frac{\sin \theta - 2 \cos \theta}{\tan \theta - \cot \theta}$. [3]
10. If $\sin \theta - \cos \theta = \frac{1}{2}$, then find the value of $\frac{1}{\sin \theta + \cos \theta}$. [3]
11. If $\sin \theta = \frac{3}{4}$, prove that $\sqrt{\frac{\operatorname{cosec}^2 \theta - \cot^2 \theta}{\sec^2 \theta - 1}} = \frac{\sqrt{7}}{3}$. [3]
12. If $\cos \theta = \frac{7}{25}$, find the value of all T-ratios of θ . [3]
13. If $\tan \theta = \frac{24}{7}$, find the value of $\sin \theta + \cos \theta$. [3]
14. If $\sec \alpha = \frac{5}{4}$ evaluate $\frac{1 - \tan \alpha}{1 + \tan \alpha}$, [3]
15. In $\triangle ABC$, right angled at B, if $\tan A = \frac{1}{\sqrt{3}}$. Find the value of $\sin A \cos C + \cos A \sin C$. [3]
16. ABC is a right triangle, right angled at C. If $A = 30^\circ$ and $AB = 40$ units, find the remaining two sides and $\angle B$. [3]
of $\triangle ABC$
17. If $\sin A = \frac{1}{3}$, evaluate $\cos A \operatorname{cosec} A + \tan A \sec A$. [3]
18. Given $15 \cot A = 8$, compute $\cos A$ and $\tan A$. [3]
19. Find the value of the trigonometric ratios if: $\operatorname{cosec} \theta = \sqrt{10}$ [3]
20. If $\cot \theta = \frac{7}{8}$, evaluate: $\cot^2 \theta$ [3]
21. In figure, $\triangle PQR$ right angled at Q, $PQ = 6$ cm, $PR = 12$ cm, Determine $\angle QPR$ and $\angle PRQ$. [3]
22. In Fig., $AD = DB$ and $\angle B$ is a right angle. Determine: [3]
 - i. $\sin \theta$
 - ii. $\cos \theta$

iii. $\tan \theta$

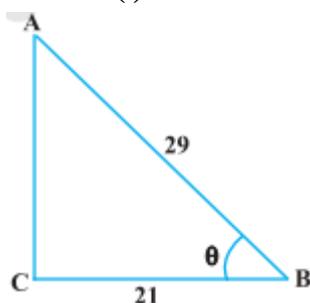
iv. $\sin^2 \theta + \cos^2 \theta$



23. In $\triangle ABC$, right angled at B, if $\tan A = \frac{1}{\sqrt{3}}$. Find the value of $\cos A \cos C - \sin A \sin C$ [3]

24. If, $\sin \theta = \frac{a^2 - b^2}{a^2 + b^2}$ find the values of the other five trigonometric ratios. [3]

25. Consider $\triangle ACB$ right angled at C in which $AB = 29$ units, $BC = 21$ units and $\angle ABC = \theta$. Determine the values of (i) $\cos^2 \theta + \sin^2 \theta$ and (ii) $\cos^2 \theta - \sin^2 \theta$ [3]



26. If $\operatorname{cosec} A = \sqrt{10}$ find other five trigonometric ratios. [3]

27. If $\operatorname{cosec} \theta = \frac{13}{12}$ find the value of $\frac{2 \sin \theta - 3 \cos \theta}{4 \sin \theta - 9 \cos \theta}$ [3]

28. Find the value of other trigonometric ratios, given that $\tan \theta = \frac{2mn}{m^2 - n^2}$ [3]

29. If $\cos A = \frac{9}{41}$, find other trigonometric ratios of $\angle A$. [3]

30. In $\triangle PQR$, right angled at Q, $PR + QR = 25$ cm and $PQ = 5$ cm. Determine the values of $\sin P$, $\cos P$ and $\tan P$. [3]

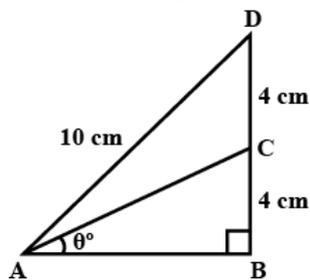
31. If $\sin \theta = \frac{\sqrt{3}}{2}$, find the value of all T-ratios of θ . [3]

32. If $5 \tan a = 4$, show that $\frac{5 \sin \theta - 3 \cos \theta}{5 \sin \theta + 2 \cos \theta} = \frac{1}{6}$ [3]

33. If $\operatorname{cosec} \theta = 2$, show that $\left(\cot \theta + \frac{\sin \theta}{1 + \cos \theta} \right) = 2$. [3]

34. If $\tan \theta = \frac{12}{13}$, find the value of $\frac{2 \sin \theta \cos \theta}{\cos^2 \theta - \sin^2 \theta}$. [3]

35. In the adjoining figure, $\angle B = 90^\circ$, $\angle BAC = \theta^\circ$, $BC = CD = 4$ cm and $AD = 10$ cm. [3]



Find

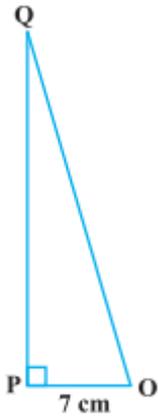
i. $\sin \theta$ and

ii. $\cos \theta$.

36. Find the value of the trigonometric ratios if: $\sec \theta = \frac{13}{5}$ [3]

37. If $\cos \theta = \frac{3}{5}$, find the value of $\left(\frac{5 \operatorname{cosec} \theta - 4 \tan \theta}{\sec \theta + \cot \theta} \right)$. [3]

38. If $\sec \theta = \frac{5}{4}$, show that $\frac{(\sin \theta - 2 \cos \theta)}{(\tan \theta - \cot \theta)} = \frac{12}{7}$. [3]
39. If $\cos \theta = \frac{8}{17}$, find the other five trigonometric ratios. [3]
40. $\angle A$ and $\angle B$ are acute angles such that $\cos A = \cos B$, then show that $\angle A = \angle B$. [3]
41. Find the value of the trigonometric ratios if: $\sin \theta = \frac{\sqrt{3}}{2}$ [3]
42. If $\angle B$ and $\angle Q$ are acute angles such that $\sin B = \sin Q$, then prove that $\angle B = \angle Q$. [3]
43. Given that $16 \cot A = 12$; find the value of $\frac{\sin A + \cos A}{\sin A - \cos A}$. [3]
44. If $\tan \theta = \frac{20}{21}$, show that $\frac{1 - \sin \theta + \cos \theta}{1 + \sin \theta + \cos \theta} = \frac{3}{7}$. [3]
45. In $\triangle OPQ$ right angled at P, $OP = 7$ cm, $OQ - PQ = 1$ cm. Determine the values of $\sin Q$ and $\cos Q$. [3]



46. Find the value of the trigonometric ratios if: $\cos \theta = \frac{7}{25}$ [3]
47. In $\triangle ABC$, right angled at B, $AB = 24$ cm, $BC = 7$ cm. Determine: [3]
- i. $\sin A \cos A$
- ii. $\sin C \cos C$
48. If $\cos \theta = \frac{12}{13}$, show that $\sin \theta(1 - \tan \theta) = \frac{35}{156}$ [3]
49. If $\tan \theta = \frac{15}{8}$, find the value of all T-ratios of θ . [3]
50. If $\cos \theta = \frac{3}{5}$, show that $\frac{(\sin \theta - \cot \theta)}{2 \tan \theta} = \frac{3}{160}$. [3]
51. Find the value of the trigonometric ratios if $\tan \theta = \frac{8}{15}$ [3]
52. Find the value of the trigonometric ratios if: $\tan \theta = 11$ [3]
53. If $\sin \theta = \frac{12}{13}$, find the value of $\frac{\sin^2 \theta - \cos^2 \theta}{2 \sin \theta \cos \theta} \times \frac{1}{\tan^2 \theta}$. [3]
54. Find the value of the trigonometric ratios if: $\cos \theta = \frac{12}{15}$ [3]
55. If $\sin \theta = \frac{a}{b}$, show that $(\sec \theta + \tan \theta) = \sqrt{\frac{b+a}{b-a}}$. [3]
56. If $3 \tan \theta = 4$, show that $\frac{(4 \cos \theta - \sin \theta)}{(2 \cos \theta + \sin \theta)} = \frac{4}{5}$. [3]
57. In a $\triangle ABC$, $\angle B = 90^\circ$, $AB = 7$ cm and $(AC - BC) = 1$ cm. Find the values of $\sin A$, $\cos A$, $\sin C$ and $\cos C$. [3]
58. If $\sin \theta = \frac{4}{5}$, what is the value of $\cot \theta + \operatorname{cosec} \theta$? [3]

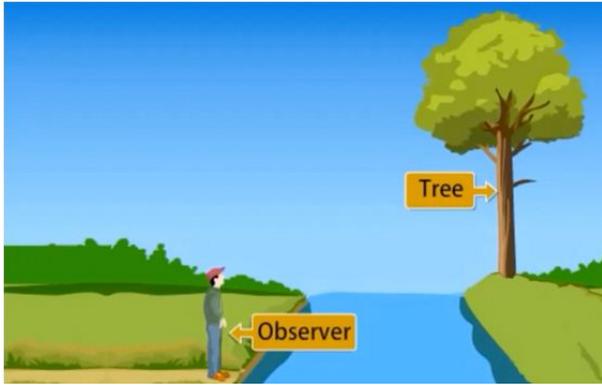
Section B

Question No. 59 to 62 are based on the given text. Read the text carefully and answer the questions: [4]

Akshat studies in DAV Public school, Vasant Kunj, Delhi. During summer vacation he went to his native place in a village. His grandfather took him to the bank of a nearby river. Akshat was very happy to see the pollution free environment near the river.

He was standing on the bank of the river He thought to measure the width of the river. He found that the angle of elevation of the top of a tree standing on the opposite bank was 60° When he moved 30 m away from the river the

angle of elevation reduced to 30°



59. What is the height of the tree?

60. What is the width of the river?

61. After moving how much distance away from the river the angle of elevation becomes 45° .

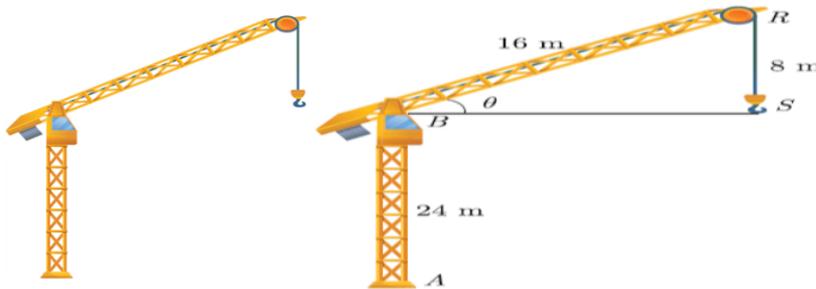
62. If the width of the river were 40 m then what would be the height of the tree selected?

Question No. 63 to 66 are based on the given text. Read the text carefully and answer the questions:

[4]

Tower cranes are a common fixture at any major construction site. They're pretty hard to miss - they often rise hundreds of feet into the air, and can reach out just as far. The construction crew uses the tower crane to lift steel, concrete, large tools like acetylene torches and generators, and a wide variety of other building materials.

A crane stands on a level ground. It is represented by a tower AB , of height 24 m and a jib BR . The jib is of length 16 m and can rotate in a vertical plane about B . A vertical cable, RS , carries a load S . The diagram shows current position of the jib, cable and load.



63. What is the distance BS ?

64. What is the angle that the jib, BR , makes with the horizontal?

65. What is the distance between the points A and S ?

66. Find the angle that the crane makes with the line AS .