MATHS

BOOKS - BAL BHARTI

TRIGONOMETRY

Solved Examples

1. If $\sin\theta = \dfrac{5}{13}$, then find $\cos\theta$ if θ is in 1st quadrant.

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2. If $\sec\theta = \dfrac{25}{7}$, then find the value of $\tan\theta$

3. If $5\sin\theta - 12\cos\theta = 0$, find the values of $\sec\theta$ and $\cos ec\theta$.

4. If $\cos\theta = \dfrac{\sqrt{3}}{2}$, then find the value of $\dfrac{1 - \sec\theta}{1 + \cos ec\theta}$.

5. $\displaystyle\int \tan^{-1}\left(\dfrac{\sin x}{1 + \cos x}\right) dx =$

6. Eliminate θ from the equations .

$x = a\sec\theta,\ y = b\tan\theta$

7. A boy is at a distance of 60 m from a tree, makes an angle of elevation of $60°$ with the top of the tree. What is the height of the tree?

8. From the top of a lighthouse, an observer looking at a ship makes an angle of depression of $60°$. If the height of the lighthouse is 90

metre, then find how far the ship is from the lighthouse. ($\sqrt{3} = 1, 73$)

9. A boy standing at a distance of 48 meters from a building observes the top of the building and makes an angle of elevation of $30°$. Find the height of the building.

10. A boy is at a distance of 60 m from a tree, makes an angle of elevation of $60°$ with the top of the tree. What is the height of the tree?

Lets Recall

1. Prove that :

$$\frac{\sin^2 \theta}{\cos \theta} + \cos \theta = \sec \theta$$

2. जर $\sin\theta = \dfrac{4}{5}$ तर $\cos\theta$ काढा.

3. The centre and radius of a circle given by equation $x = 2 + 3\cos\theta$, $y = 3\sin\theta - 3$ are

4. If $\tan\theta = 1$, $then \tan(90 - \theta) = $?

5. Prove that :

$$\frac{\sin^2 \theta}{\cos \theta} + \cos \theta = \sec \theta$$

6. Write the truth values of the following: 4 is an odd or 1 is prime.

7. Find the square roots of the following: 18i

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8. Find the square roots of the following: 18i

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9. Find the square roots of the following: 18i

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10. Find the square roots of the following: 18i

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11. If $\tan\theta = 2$ then find values of other trigonometric ratios.

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Practice Set 6 1

1. If $\sin\theta = \dfrac{20}{29}$, then find the value of $\cos\theta$.

2. If $\tan\theta = 3/4$ then find the value of $\sec\theta$ and $\cos\theta$.

3. If $\cot\theta = 40/9$, find the value of $\cos es\theta$ and sin theta`.

4. If $5\sec\theta - 12\cos ec\theta = 0$, find the values of $\sec\theta$, $\cos\theta$ and $\sin\theta$.

5. If $\tan\theta = 1$ then find the vlue of

$$\frac{\sin\theta + \cos\theta}{\sec\theta + \cos ec\theta}$$

6. Prove that :

$$\frac{\sin^2 \theta}{\cos \theta} + \cos \theta = \sec \theta$$

7. prove that $\cos^2 \theta \left(1 + \tan^2 \theta\right) = 1$

8. prove that $\sqrt{(1 - \sin \theta)}\ /\ (1 + \sec \theta)) =$ $\sec \theta - \tan \theta$

9. prove that $(\sec\theta - \cos\theta)(\cot\theta + \tan\theta)$ = $\tan\theta.\sec\theta$

10. prove that $\cot\theta + \tan\theta = \cos ec\theta.\sec\theta$

11. prove that $\dfrac{1}{\sec\theta - \tan\theta} = \sec\theta + \tan\theta$

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12. Prove that :

$$\sin^4\theta + \cos^4\theta = 1 - 2\cos^2\theta + 2\cos^4\theta$$

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13. Prove that $\sec\theta + \tan\theta = \dfrac{\cos\theta}{1 - \sin\theta}$

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14. If $\tan\theta + \dfrac{1}{\tan\theta} = 2$, then show that $\tan^2\theta + \dfrac{1}{\tan^2\theta} = 2.$

15. prove that

$$\dfrac{\tan A}{\left(1 + \tan^2 A\right)^2} + \dfrac{\cot A}{\left(1 + \cot^2 A\right)^2} = \sin A \cos A.$$

16. prove that $\sec^4 A\left(1 - \sin^4 A\right) - 2\tan^2 A =$ 1.

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17. prove that $\dfrac{\tan\theta}{\sec\theta - 1} = \dfrac{\tan\theta + \sec\theta + 1}{\tan\theta + \sec\theta - 1}$

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Practice Set 6 2

1. A person is standing at a distance of 80 m from a church looking at its top. The angle of elevation is of $45°$. Find the height of the church.

2. From the top of a lighthouse, an observer looking at a ship makes an angle of depression of $60°$. If the height of the lighthouse is 90

metre, then find how far the ship is from the lighthouse. ($\sqrt{3} = 1, 73$)

3. Two buildings are facing each other on either side of a road of width 12m. From the top of the first building, which is 10 m high, the angle of elevation of the top of the second is $60°$. What is the height of the second building?

4. Two poles of heights 18 metre and 7 metere are erected on a ground. The length of the wire fastened at their tops in 22 meters. Find the angle made by the wire with the horizontal.

5. A storm broke a tree and the treetop rested 20 m from the base of the tree, making an

angle of $60°$ with the horizontal. Find the height of the tree.

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6. A kite is flying at a height 80 m above the ground . The string of the kite which is temporarily attached to the ground makes an angle $45°$ with the ground. If there is no slack in the string, then the length of the string is

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1. The $\sin\theta + \mathrm{cosec}\theta = 2,$ then:

$\sin^2\theta + \mathrm{cosec}^2\theta$=............ A) 1 B) 3 C) 2 D) 4

A. 1

B. 0

C. $\dfrac{1}{2}$

D. $\sqrt{2}$

Answer: A

2. (2) $\cos ec45^\circ$ = ?

A. $\dfrac{1}{\sqrt{2}}$

B. $\sqrt{2}$

C. $\dfrac{\sqrt{3}}{2}$

D. $\dfrac{2}{\sqrt{3}}$

Answer: B

3. (3) $1 + \tan^2 \theta$ =?

A. $\cot^2 \theta$

B. $\mathrm{cosec}^2 \theta$

C. $\sec^2 \theta$

D. $\tan^2 \theta$

Answer: C

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4. What we see at a higher level from the horizontal line, angle formed is ....,

A. angle of elevation

B. angle of depression.

C. 0

D. straight angle.

Answer: A

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1. If $\sin\theta$ = 11/61 find the values of $\cos\theta$ using trigonometric identity.

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2. (1) If $\tan\theta$=2, find the values of other trigonometric ratios using the identities.

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3. If $\sec\theta$ = 13/12, find values of other trigonometric ratios.

4. Prove the following : (i) $\sec\theta\ (1 - \sin\theta)\ (\sec\theta + \tan\theta$) = 1

5. Prove the following : $(\sec\theta + \tan\ \text{theta})(1\text{-}\sin\theta) = \cos\theta$

6. Prove the following : $\sec^2\theta + \cos ec^2\theta = \sec^2\theta \times \cos ec^\theta$

7. Prove the following : $\cot^2\theta - \tan^2\theta = \cos ec^2\theta - \sec^2\theta$

8. Prove the following $:\tan^4\theta + \tan^2\theta =$ $\sec^4\theta - \sec^2\theta$

9. Prove that : (ii) $$\frac{1}{1+\sin\theta} + \frac{1}{1-\sin\theta} = 2\sec^2\theta$$

10. Prove the following : $\sec^6 x - \tan^6 x =$ $1 + 3\sec^2 x \times \tan^2 x$

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11. Prove the following : $\dfrac{\tan\theta}{\sec\theta + 1} = \dfrac{\sec\theta - 1}{\tan\theta}$

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12. Prove the following : $\dfrac{\tan^3\theta - 1}{\tan\theta - 1} =$ $\sec^2\theta + \tan\theta$

13. Prove the following : $\dfrac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} =$

(1)/ (sec theta - tan theta)`

14. A boy standing at a distance of 48 meters from a building observes the top of the building and makes an angle of elevation of $30°$. Find the height of the building.

15. From the top of a lighthouse, an observer looks at a ship and finds the angle of depression to be $30°$. If the height of the lighthouse is 100 m, then find how far is that ship from the lighthouse.

16. Two buildings are in front of each other on a road of width 15 meters. From the top of the

first building, having a height of 12 meters, the angle of elevation of the top of the second building is $30°$. What is the height of the second building?

17. A ladder on the platform of a fire brigade van can be elevated at an angle of $70°$ to the maximum. The length of the ladder can be extended upto 20 m . If the platform is 2 m

above the ground upto which the ladder can reach . $(\sin 70° = 0.94)$

18. From the top of a lighthouse, an observer looking at a ship makes an angle of depression of $60°$. If the height of the lighthouse is 90 metre, then find how far the ship is from the lighthouse. $(\sqrt{3} = 1, 73)$