MATHS

BOOKS - UNIQUE MATHS (HINGLISH)

TRIGONOMETRY

Practice Test 6 1

1. If $\sin\theta = \frac{7}{25}$, find the vales of $\cos\theta$ and $\tan\theta$.

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2. If $\tan\theta = \frac{3}{4}$ then find the values of $\sec\theta$ and $\cos\theta$

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3. If $\cot\theta = \frac{40}{9}$, find the values of $\cos ec\theta$ and $\sin\theta$.

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

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5. If $\tan\theta = 1$, find tha value of $\frac{\sin\theta + \cos\theta}{\sec\theta + \cos ec\theta}$.

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6. Prove that:

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

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7. Prove that:

$$\cos^{\theta}\left(1 + \tan^2\theta\right) = 1$$

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8. Prove that : $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = \sec\theta - \tan\theta$

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9. Prove that:

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

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10. Prove that:

$\cot\theta + \tan\theta = \cos ec\theta\sec\theta.$

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11. Prove that

$$\frac{1}{\sec\theta - \tan\theta} = \sec\theta + \tan\theta$$

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12. Prove that:

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

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13. Prove that

$$\sec\theta + \tan\theta = \frac{\cos\theta}{1 - \sin\theta}$$

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14. $\tan\theta + \frac{1}{\tan\theta} = 2$ then prove that $\tan^2\theta + \frac{1}{\tan^2\theta} = 2$

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15. Prove that:

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

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16. Prove that:

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

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17. Prove: $\frac{\tan\theta}{\sec\theta-1}=\frac{\tan\theta+\sec\theta+1}{\tan\theta+\sec\theta-1}$

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Practice Test 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.

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2. From the top of a lighthouse, an observer looking at a boat makes an angle of depression of 60°. If the height of the lighthouse is $90m$, then find how far is the boat from the lighthouse.

$\left(\sqrt{3} = 1.73\right)$

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

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

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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 of 60 m above the ground. The string arrached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60°. Find the length of the string, assuming that there is no slack in the string.

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Problem Set

1. $\sin\theta.\ \cos ec\theta$ = ?

A. 1

B. 0

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

D. $\sqrt{2}$

Answer: A

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2. $\text{cosec}45^\circ = ...$

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

B. $\sqrt{2}$

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

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

Answer: B

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

A. $\cot^2\theta$

B. $\cos ec^2\theta$

C. $\sec^2\theta$

D. $\tan^2\theta$

Answer: C

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

A. Angle of elevation

B. Angle of depression

C. Straight angle

D. Angle of elevation

Answer: A

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5. If $\sin\theta = \frac{11}{61}$, ffind the value of $\cos\theta$ using trigonometric identity.

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6. If $\tan\theta = 2$, find the values of other trigonometric ratios.

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7. If $\sec\theta = \frac{13}{12}$, find the values of other trigonometric ratios.

A. q

B.

C.

D.

Answer: $\sin\theta = \frac{5}{13}$

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8. Prove that :

$\sec\theta(1-\sin\theta)(\sec\theta+\tan\theta)=1$

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9. Prove that

$(\sec\theta+\tan\theta)(1-\sin\theta)=\cos\theta$

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10. Prove the following:

$\sec^2\theta+\cos ec^2\theta=\sec^2\theta\times\cos ec^2\theta$

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11. Prove the following:

$\cot^2\theta - \tan^2\theta = \cos ec^2\theta - \sec^2\theta$

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12. Prove that :

$\tan^4\theta + \tan^2\theta = \sec^4\theta - \sec^2\theta$

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13. Prove that

$$\frac{1}{1-\sin\theta} + \frac{1}{1+\sin\theta} = 2\sec^2\theta$$

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14. Prove the following:

$$\sec^6 x - \tan^6 x = 1 + 3\sec^2 x \times \tan^2 x$$

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15. Prove that :

$$\frac{\tan\theta}{\sec\theta + 1} = \frac{\sec\theta - 1}{\tan\theta}$$

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16. Prove the following:

$$\frac{\tan^3\theta - 1}{\tan\theta - 1} = \sec^2\theta + \tan\theta$$

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17. Prove that

$$\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \frac{1}{(\sec\theta - \tan\theta)}.$$

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18. 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 .

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19. From the top of a lighthouse, an observer looking at a boat makes an angle of depression of 60°. If the height of the lighthouse is $90m$, then find how far is the boat from the

lighthouse.

$(\sqrt{3} = 1.73)$

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20. Two building are facing each other on a road of width 15 metre. From the top of the first building, which is 12m hight, the angle of elevation of the top of the second is found to be 30°. What is the height of the second building

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21. A ladder on the platform of a firebrigade van can be elevated at an angel of 70° to the maximum. The length of the ladder can be extended upto $20m$.If the platform is $2m$ above

the ground, find the maximum height from the ground upto which the ladder can reach $(\sin 70^\circ = 0.94)$

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22. While landing at an airport, a pilot made an angle of derpession of 20°. Average speed of the plane was $200 km/h$. The plane reached the ground after 54 seconds. Find the height at which the plane was when it started landing.

$(\sin 20^\circ = 0.342)$

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Hots Solved

1. Prove that

$$\frac{1+\sin x-\cos x}{1+\sin x+\cos x}+\frac{1+\sin x+\cos x}{1+\sin x-\cos x}$$

=2 cosec x

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2. Prove : $\frac{\cos^2\theta}{1-\tan\theta}+\frac{\sin^3\theta}{\sin\theta-\cos\theta}=1+\sin\theta\cos\theta$

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3. A person standing on the bank of a river observes that the angle of elevation of the top of a tree standing on the opposite bank is 60°. When he moves 40 m away from the bank, he finds the angle of elevation to be 30°. Find the height of the tree and the width of the river. $\left(\sqrt{3}=1.73\right)$

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4. The angle of elevation of cloud from a point 60 m above a lake is 30° and the angle of depression of the reflection of cloud in the lake is 60° . Find the height of the cloud .

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5. A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30º, which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60º. Find the time taken by the car to reach the foot of the tower from this point

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6. A man on a cliff observes a boat at an angle of depression 30° which is sailing towards the shore to the point immediately beneath him. Three minutes later the angle of depression of the boat is found to be 60°. Assuming that the boat sails at a uniform speed, determine how much more time it will take to reach the shore.

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7. A bird was flying in a line parallel to the ground from north to south at a height of 2000 metres. Tom, standing in the middle of the field, first he observed the bird in the north at an angle of 30° . After 3 min, he again observed in the south at an angle of 45°. find the speed of the bird in km per hour. $\left(\sqrt{3} = 1.73\right)$

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8. In a right angled triangle ABC, $m\angle A = 90^\circ$ and the value of $\frac{5\sin^2 B + 7\cos^2 C + 4}{3 + 8\tan^2 60} = \frac{7}{27}$. Find the perimeter of $\triangle ABC$ if AC = 3

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9. Prove that $(\sin\theta + \cos\theta)(\cos ec\theta - \sec\theta) = \cos ec\theta.\sec\theta - 2\tan\theta$

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Unique Practice Session

1. The value of $\cos 90^\circ$ is .....

A. -1

B. 1

C. 0

D. Not defined

Answer: C

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2. If $\sqrt{3}\tan\theta = 3\sin\theta$, the value of $\sec\theta$ is .....

A. $\frac{\sqrt{3}}{3}$

B. $\frac{3}{\sqrt{3}}$

C. $\frac{3\sqrt{3}}{\sqrt{3}}$

D. $\frac{3}{3\sqrt{3}}$

Answer:

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3. If $\sin x = \frac{3}{4}$, then cos x = ?

A. $\frac{2}{3}$

B. $\frac{\sqrt{3}}{2}$

C. $\frac{\sqrt{7}}{4}$

D. $\frac{1}{2}$

Answer: C

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4. $\frac{1}{1+\sin\theta}+\frac{1}{1-\sin\theta}=?$

A. $\sec^2\theta$

B. $2\sec^2\theta$

C. $\cos ec^2\theta$

D. $2\cos ec^2\theta$

Answer: B

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5. If $\cos\theta=\frac{1}{\sqrt{2}}$ then θ

A. 30°

B. 45°

C. 60°

D. 90°

Answer: B

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6. If $\cos A = \frac{4}{5}$ than tan A = ?

A. $\frac{3}{5}$

B. $\frac{3}{4}$

C. $\frac{4}{3}$

D. $\frac{5}{3}$

Answer: B

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7. If a pole height 6m casts a shadow $2\sqrt{3}$m long on the ground, then the sun's elevation is

A. 60°

B. 45°

C. 30°

D. 90°

Answer: C

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8. if $\sin\theta = \frac{5}{13}$, find the value of $\cos\theta$

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9. Write the maximum and minimum values of $\cos\theta$.

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10. If $\tan A = \frac{3}{4}$ and $A + B = 90o$, then what is the value of $\cot B$?

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11. Write the value of $\cot^2\theta - \frac{1}{\sin^2\theta}$.

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12. If $\sin\theta = \frac{4}{5}$, what is the value of $\cot\theta + \cos ec\theta = ?$

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13. The value of $\cot^2\theta - 9\cos ec^2\theta$ is .....

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14. What is the value of $(1+\tan^2\theta)(1-\sin\theta)(1+\sin\theta) = ?$

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15. If $\cos A = \frac{7}{25}$, find the value of $\tan A + \cot A$.

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

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17. If $\sec\theta = \frac{25}{7}$ then find the value of $\tan\theta$.

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18. Prove that

$$\sqrt{\sec^2\theta + \text{cosec}^2\theta} = \tan\theta + \cot\theta.$$

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19. If $\sin\theta + \sin^2\theta = 1$, prove that $\cos^2\theta + \cos^4\theta = 1$

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20. Prove: $\frac{\cos\theta}{1-\sin\theta} = \frac{1+\sin\theta}{\cos\theta}$

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21. सिद्ध कीजिए कि : $\sin^2\theta + \cos^4\theta = \cos^2\theta + \sin^4\theta$

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22. If $\tan\theta = \frac{4}{5}$, find the value of $\frac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta}$.

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23. If $\cos ec\theta - \cot\theta = \alpha$, write the value of $\cos ec\theta + \cot\alpha$

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24. If $\tan\theta = 1$, then $\frac{\sin\theta + \cos\theta}{\sec\theta + \cos ec\theta} =$

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25. त्रिकोणमितीय सर्वसमिकाओं को सिद्ध करो :

$$\frac{1}{\cos ecA - \cot A} - \frac{1}{\sin A} = \frac{1}{\sin A} - \frac{1}{\cos ecA + \cot A}$$

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26. Prove that $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} = \sec\theta + \tan\theta$

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27. The length of the shadow of a tower standing on level plane is found to be $2x$ metres longer when the suns altitude is $30o$ than when it was $45o$. Prove that the height of tower is $x\left(\sqrt{3}+1\right)$ metres.

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28. A circus artist is climbing from the ground along a rope stretched from the top of a vertical pole and tied at the ground. The height of the pole is 12 m and the angle made by the rope with ground level is $30o$. Calculate the distance covered by the artist in climbing to the top of the pole.

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29. An observer at a distance of 10 m from a tree looks at the top of the tree , the angle of elevation is 60° . What is the height of the tree ? $(\sqrt{3} = 1.73)$

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30. From the top of a building , an observer is looking at a scooter parked at some distance away , makes an angle of depression of 30° . If the height of the building is 40 m , find how far the scooter is from the building. $\left(\sqrt{3} = 1.73\right)$

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31. The angle of elevation of a jet plane from a point A on the grund is 60^0 . After and flight of 30 seconds, the angle of

elevation changes to 30^0. If the jet plane is flying at a constant height of $3600\sqrt{3}m$, find the speed of the jet plane.

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32. Prove that :

$$\frac{\tan\theta}{\sec\theta - 1} + \frac{\tan\theta}{\sec\theta + 1} = 2\cos ec\theta$$

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33. Prove that

$$(1 + \tan\theta)^2 + (1 + \cot\theta)^2 = (\sec\theta + \cos ec\theta)^2$$

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34. Prove that

$$\left(1+\frac{1}{\tan^2 A}\right)\left(1+\frac{1}{\cot^2 A}\right)=\frac{1}{\sin^2 A-\sin^4 A}$$

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35. Prove that: $\frac{\sec\theta-1}{\sec\theta+1}=\left(\frac{\sin\theta}{1+\cos\theta}\right)^2$

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36. Two buildings are in front of each other on either side of a road of width 10 metres. From the top of the first building which is 30 metres high, the angle of elevation to the top of the second is 45°. What is the height of the second building?

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

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38. To find the width the river, a man observes the top of a tower on the opposite bank making an angle of elevation 61°. When he moves $50m$ backward from bank and observes the same top of the tower, his line of vision makes an angle of elevationfo 35°. Find the height of the tower and width of the river. $(\tan 61^\circ = 1.8, 35^\circ = 0.7)$

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39. Eliminate θ if $x = a\cot\theta - b\cos ec\theta$ and $y = a\cot\theta + b\cos ec\theta$.

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

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41. Roshani saw an eagle on the to of a tree at an angle of elevation of 61°, while she was standing at the door of her house. She went on the terrace of the house so that she could see it clearly. The terrace was at a height of $4m$. While observing the eagle from there the angle of elevation was 52°.

At what height from the ground was the eagle?

$\tan 61^\circ = 1.8, \tan 52^\circ = 1.28, \tan n29^\circ = 0.55, \tan 38^\circ = 0.78)$

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42. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle of $30o$ with the ground. The distance between the foot of the tree to the point where the top touches the ground is 10m. Find the height of the tree.

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Assignment

1. If sinx = $\frac{3}{4}$, then cos x = ?

A. $\frac{2}{3}$

B. $\frac{\sqrt{3}}{2}$

C. $\frac{\sqrt{7}}{4}$

D. $\frac{1}{2}$

Answer:

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2. If cos A=$\frac{4}{5}$, then the value of tanA is

A. $\frac{3}{5}$

B. $\frac{3}{4}$

C. $\frac{4}{3}$

D. $\frac{5}{3}$

Answer:

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3. Prove that:

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

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4. Complete the relation in ratios given below .

$(i)\dfrac{\sin\theta}{\cos\theta} = \square$

$(ii)\sin\theta = \cos(90 - \square)$

$(iii)\cos\theta = \sin(90 - \square)$

$(iv)\tan\theta \times \tan(90 - \theta) = \square$

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5. Complete the equation

$\sin^2\theta + \cos^2\theta =$

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6. Write the values of the follwing trigonometric ratios

$(i)\sin 30^\circ = \frac{1}{\square}$

(ii) $\cos 30^\circ = \frac{\square}{\square}$

$(iii)\tan 30^\circ = \frac{\square}{\square}$

(iv) $\sin 60^\circ = \frac{\square}{\square}$

$(v)\cos 45^\circ = \frac{\square}{\square}$

$(vi)\tan 45^\circ = \square$

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7. A ladder on the platform of a firebrigade van can be elevated at an angel of 70° to the maximum. The length of the ladder can be extended upto $20m$.If the platform is $2m$ above the ground, find the maximum height from the ground upto which the ladder can reach $(\sin 70^\circ = 0.94)$

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8. Prove that : $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = \sec\theta - \tan\theta$

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9. $\tan\theta + \frac{1}{\tan\theta} = 2$ then prove that $\tan^2\theta + \frac{1}{\tan^2\theta} = 2$

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10. A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of $30o$, which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depres

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11. Prove that

$$\frac{1+\sin x-\cos x}{1+\sin x+\cos x}+\frac{1+\sin x+\cos x}{1+\sin x-\cos x}$$

=2 cosec x

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12. Prove the following:

$$\sec^6 x-\tan^6 x=1+3\sec^2 x\times\tan^2 x$$

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