



# MATHS

# **BOOKS - UNIQUE MATHS (HINGLISH)**

# TRIGONOMETRY

Practice Test 61

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



2. If 
$$an heta = rac{3}{4}$$
 then find the values of  $\sec heta$  and  $\cos heta$ 

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

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4. If  $5 \sec heta - 12 \cos e c heta = 0$ , find the values of  $\sec heta, \cos heta$  and

 $\sin \theta$ .

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5. If 
$$an heta = 1$$
, find tha value of  $rac{\sin heta + \cos heta}{\sec heta + \cos heta heta}.$ 

$$rac{\sin^2 heta}{\cos heta}+\cos heta=\sec heta.$$

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7. Prove that:

$$\cos^{ heta}ig(1+ an^2 hetaig)=1$$

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**8.** Prove that : 
$$\sqrt{rac{1-\sin heta}{1+\sin heta}}=\sec heta- an heta$$

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

# • Watch Video Solution 10. Prove that: $\cot \theta + \tan \theta = \cos ec\theta \sec \theta.$

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11. Prove that

 $rac{1}{\sec heta- an heta}= \sec heta+ an heta$ 

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

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$$\sec heta + an heta = rac{\cos heta}{1-\sin heta}$$

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14. 
$$an heta+rac{1}{ an heta}=2$$
 then prove that  $an^2 heta+rac{1}{ an^2 heta}=2$ 

$$rac{ an A}{ig(1+ an^2 Aig)^2}+rac{\cos A}{ig(1+ an^2 Aig)^2}=\sin A\cos A.$$

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16. Prove that:

$$\operatorname{sec}^4 A ig( 1 - \sin^4 A ig) - 2 \tan^2 A = 1.$$

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17. Prove: 
$$\frac{ an heta}{\sec heta - 1} = \frac{ an heta + \sec heta + 1}{ an heta + \sec heta - 1}$$

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  $45^{\circ}$ . 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  $60^{\circ}$ . If the height of the lighthouse is 90m, then find how far is the boat from the lighthouse.

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

**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  $60^{\circ}$ . 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.



5. A storm broke a tree and the treetop rested 20 m from the base of the tree, making an angle of  $60^{\circ}$  with the horizontal.

Find the height of the tree.



**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.



**Problem Set** 

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

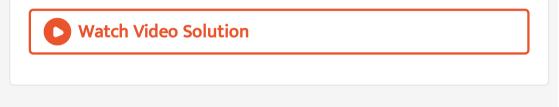
A. 1

B. 0

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

D.  $\sqrt{2}$ 

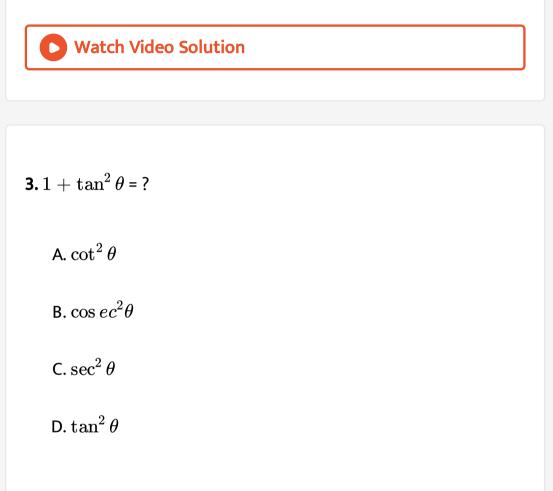
Answer: A



**2.**  $\operatorname{cosec}45^{\circ} = \ldots$ 

A. 
$$\frac{1}{\sqrt{2}}$$
  
B. 
$$\sqrt{2}$$
  
C. 
$$\frac{\sqrt{3}}{2}$$
  
D. 
$$\frac{2}{\sqrt{3}}$$

### Answer: B



#### Answer: C



**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.

**6.** If an heta = 2, find the values of other trigonometric ratios.



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

A. q

Β.

C.

D.

Answer:  $\sin heta = rac{5}{13}$ 

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

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9. Prove that

 $(\sec heta+ an heta)(1-\sin heta)=\cos heta$ 

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**10.** Prove the following:

 $\sec^2 heta + \cos ec^2 heta = \sec^2 heta imes \cos ec^2 heta$ 

**11.** Prove the following:

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

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12. Prove that :

$$an^4 heta+ an^2 heta=\sec^4 heta-\sec^2 heta$$

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$$rac{1}{1-\sin heta}+rac{1}{1+\sin heta}=2\sec^2 heta$$

**14.** Prove the following:

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

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#### 15. Prove that :

an heta	_	$\sec  heta - 1$		
$\overline{\sec  heta+1}$ –		an heta		



**16.** Prove the following:

 $rac{ an^3 heta-1}{ an heta-1}=\sec^2 heta+ an heta$ 

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



**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  $30^{\circ}$ . Find the height of the building .



**19.** From the top of a lighthouse, an observer looking at a boat makes an angle of depression of  $60^{\circ}$ . 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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**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  $30^{\circ}$ . What is the height of the second building



**21.** A ladder on the platform of a firebrigade van can be elevated at an angel of  $70^{\circ}$  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  $20^{\circ}$ . 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

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

=2 cosec x



**2.** Prove : 
$$rac{\cos^2 heta}{1- an heta}+rac{\sin^3 heta}{\sin heta-\cos heta}=1+\sin heta\cos heta$$

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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  $60^{\circ}$ . When he moves 40 m away from the bank, he finds the angle of elevation to be  $30^{\circ}$ . Find the height of the tree and the width of the river. ( $\sqrt{3} = 1.73$ )

**4.** The angle of elevation of cloud from a point 60 m above a lake is  $30^{\circ}$  and the angle of depression of the reflection of cloud in the lake is  $60^{\circ}$ . Find the height of the cloud .



**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 30°, 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 60°. Find the time taken by the car to reach the foot of the tower from this point



**6.** A man on a cliff observes a boat at an angle of depression  $30^{\circ}$  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  $60^{\circ}$ . 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  $30^{\circ}$ . After 3 min, he again observed in the south at an angle of  $45^{\circ}$ . find the speed of the bird in km per hour.  $(\sqrt{3} = 1.73)$ 

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

 $(\sin heta+\cos heta)(\cos heta c heta-\sec heta)=\cos heta c heta\cdot \sec heta-2 an heta$ 

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

A. -1

B. 1

C. 0

D. Not defined

#### Answer: C



2. If  $\sqrt{3} an heta = 3 \sin heta$ , the value of  $\sec heta$  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:



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

A. 
$$\frac{2}{3}$$
  
B.  $\frac{\sqrt{3}}{2}$   
C.  $\frac{\sqrt{7}}{4}$   
D.  $\frac{1}{2}$ 

# Answer: C

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



**5.** If 
$$\cos \theta = rac{1}{\sqrt{2}}$$
 then  $heta$ 

# A. $30^{\,\circ}$

B.  $45^{\circ}$ 

 $\mathsf{C.}\, 60^{\,\circ}$ 

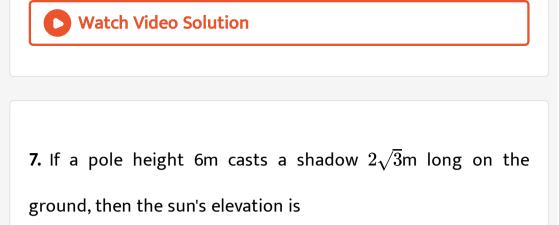
D.  $90^{\circ}$ 

#### 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** 



A.  $60^{\,\circ}$ 

B.  $45^{\circ}$ 

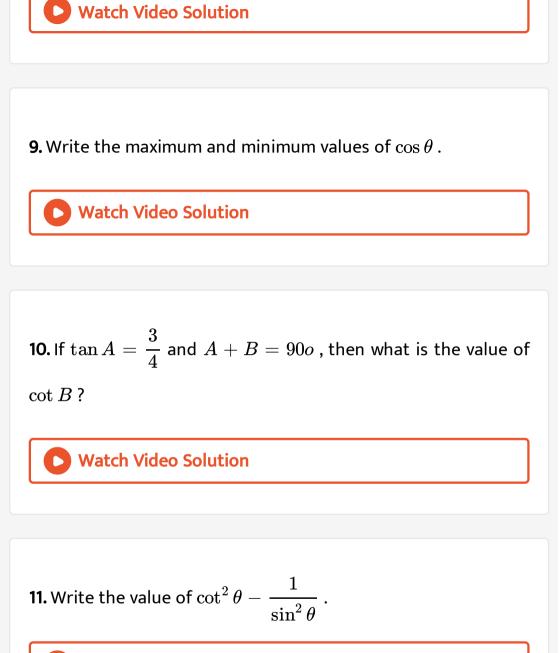
C.  $30^{\circ}$ 

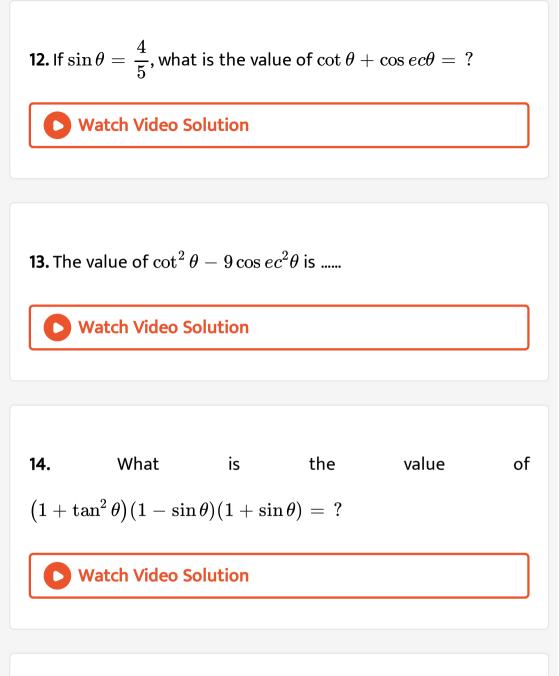
D.  $90^{\circ}$ 

#### Answer: C



**8.** if 
$$\sin heta = rac{5}{13}$$
 , find the value of  $\cos heta$ 





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

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

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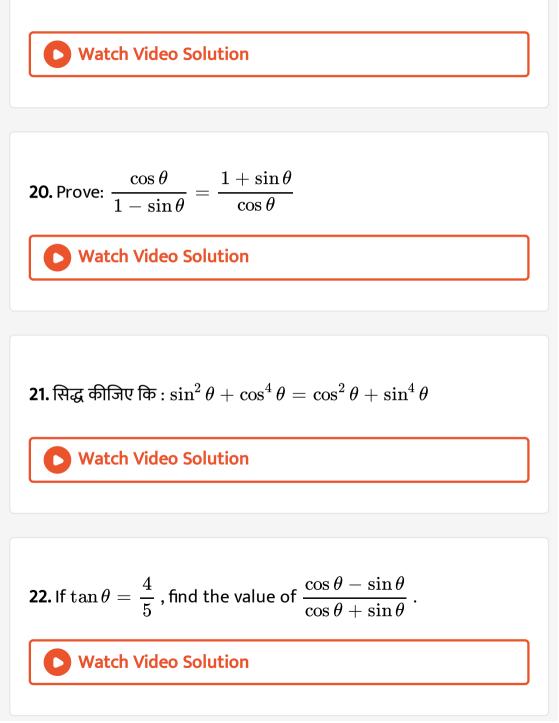
17. If 
$$\sec \theta = \frac{25}{7}$$
 then find the value of  $\tan \theta$ .

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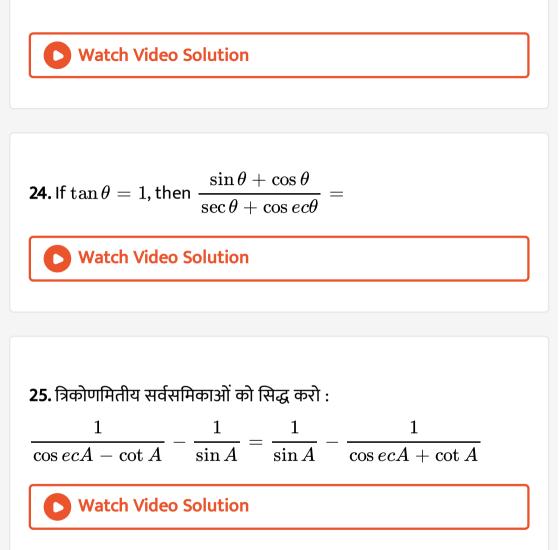
18. Prove that

$$\sqrt{\mathrm{sec}^2\, heta+\mathrm{cosec}^2 heta= an heta+\mathrm{cot}\, heta}.$$

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



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



**26.** Prove that 
$$\sqrt{rac{1+\sin heta}{1-\sin heta}}=\sec heta+ an heta$$

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 30othan when it was 45o. Prove that the height of tower is  $x(\sqrt{3}+1)$  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.



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

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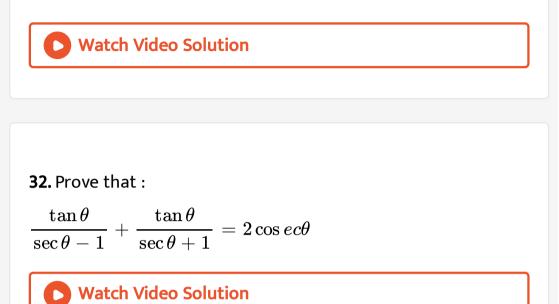
**30.** From the top of a building , an observer is looking at a scooter parked at some distance away , makes an angle of depression of  $30^{\circ}$  . If the height of the building is 40 m , find how far the scooter is from the building. ( $\sqrt{3} = 1.73$ )



**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.



33. Prove that

$$\left(1+ an heta
ight)^2+\left(1+ an heta
ight)^2=\left(\sec heta+\cos ext{ec} heta
ight)^2$$

**34.** Prove that  

$$\left(1 + \frac{1}{\tan^2 A}\right) \left(1 + \frac{1}{\cot^2 A}\right) = \frac{1}{\sin^2 A - \sin^4 A}$$
**Value Watch Video Solution**
  
**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  $45^{\circ}$ . What is the height of the second building?

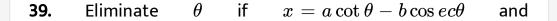


**37.** If  $5\sin\theta - 12\cos\theta = 0$  , find the values of  $\sec\theta$  and  $\cos ec\theta$ .

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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  $61^{\circ}$ . When he moves 50m backward from bank and observes the same top of the tower, his line of vision makes an angle of elevation  $35^{\circ}$ . Find the height of the tower and width of the river.  $(\tan 61^{\circ} = 1.8, 35^{\circ} = 0.7)$ 





$$y = a \cot \theta + b \cos ec \theta.$$



**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  $61^{\circ}$ , 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  $52^{\circ}$ .

At what height from the ground was the eagle?

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

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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.  $\frac{1}{2}$ 

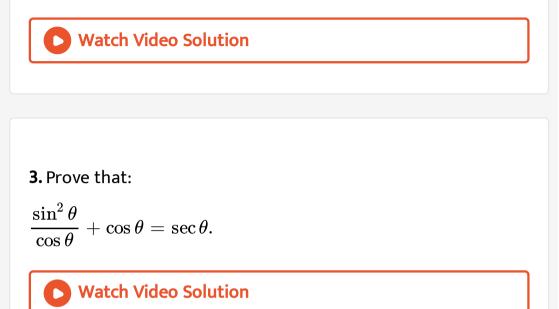
#### Answer:



**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:



4. Complete the relation in ratios given below .

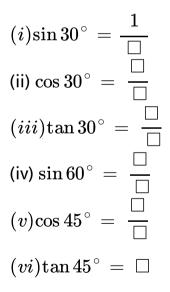
$$egin{aligned} (i)rac{\sin heta}{\cos heta} &= &\square\ (ii)\sin heta &= \cos(90 - &\square\)\ (iii)\cos heta &= \sin(90 - &\square\)\ (iv) an heta & imes an(90 - heta) &= &\square\ \end{aligned}$$

5. Complete the equation

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



6. Write the values of the follwing trigonometric ratios



7. A ladder on the platform of a firebrigade van can be elevated at an angel of  $70^{\circ}$  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 : 
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9. 
$$an heta+rac{1}{ an heta}=2$$
 then prove that  $an^2 heta+rac{1}{ an^2 heta}=2$ 

**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

0	Watch	Video	So	lution

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

=2 cosec x

11. Prove that

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12. Prove the following:

$$\sec^6 x - an^6 x = 1 + 3 \sec^2 x imes an^2 x$$

