RAVI MATHS TUITION & TEST PAPERS , WHATSAPP 8056206308

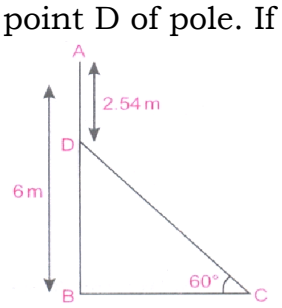
10TH MATHS PREVIOUSLY ASKED CHP Trigonometry

10th Standard

Maths

2 Marks 49 x 2 = 98

1) In Figure AB is a 6 m high pole and CD is a ladder inclined at an angle of 60° to the horizontal and reches up to a point D of pole. If AD = 2.54 m, find the length of the ladder. $(use\sqrt{3} = 1.73)$



2) A ladder, leaning against a wall, makes an angle of 60° with the horizontal. If the foot of the ladder is 2.5 m away from the wall. find the length of the ladder.

3) An observer, 1.7 m tall, is $20\sqrt{3}$ m away from a tower. The angle of elevation from the eye of observer to the top of tower is 30° . Find the height of tower.

4) A man on the deck of a ship, 12 m above water level, observes that the angle of elevation of the top of a cliff is 60° and the angle of depression of the base of the cliff is 30°. Find the distance of the cliff from the ship and the height of the cliff. $(Use\sqrt{3} = 1.732)$

5) From the top of a tower 50 m high the angles of depression of the top and bottom of a pole are observed to be 45° and 60° respectively. Find the height of the pole.

6) The angle of elevation of an aeroplane from a point on the ground is 60°. After a flight of 30 seconds the angle of elevation becomes 30°. If the aeroplane is flying at a constant height of $3000\sqrt{3}$ m, find the speed of the aeroplane.

7) The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 45°. If the tower is 30 m high, find the height of the building.

8) The angle of elevation of an aeroplane from a point A on the ground is 60° . After a flight of 15 seconds, the angle of elevation changes to 30° . If the aeroplane is flying at a constant height of $1500\sqrt{3}$ m, find the speed of the plane in km/hr.

9) The angle of elevation of the top of a vertical tower from a point on the ground is 60° , From another point 10 m vertically above the first, its angle of elevation is 30° . Find the height of the tower.

10) The tops of two towers of height x and y, standing on level ground, subtend angles of 30° and 60° respectively at the centre of the line joining their feet, then find x : y.

11) From the top of a tower 100 m high, a man observes two cars on the opposite sides of the tower with angles of depression 30° and 45° respectively. Find the distance between the cars.$[Use\sqrt{3} = 1.732]$

12) When the length of the shadow of a pole of height 10 m is equal to 10 m, then find the angle of elevation of these source of light.

13) A ladder 15m long just reaches the top of a vertical wall.If the ladder makes an angle of 60^0 with the wall, then the height of the wall.

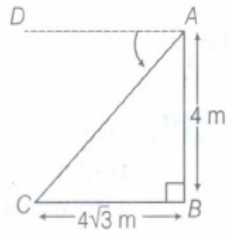
14) The ratio of the length of a rod and its shadow is $1 : \sqrt{3}$, then find the angle of elevation of the sun.

15) the shadow of a tower standing on a level ground is found to be 30m longer when the sun's altitude is 30^0 than when it is 60^0.Find the height of the tower.

16) Find the altitude of the sun, if the shadow of a vertical pole is $\frac{1}{\sqrt{3}}$of its original height.

17) If two towers of heights x m and y m subtend angles of $30^\circ \& 60^\circ$ respectively at the centre of a line joining their feet, then find the ratio of x : y.

18) The figure shows the observation of point C from point A. Find the angle of depression from A.



19) The angle of depression of a car standing on the ground, from the top of a 75 m high tower, is 30°. Find the distance of the car from the base of the tower.

20) An observer, 1.5 m tall, is 20.5 m away from a tower 22 m high. Determine the angle of elevation of the top of the tower from the eye of the observer.

21) Find the length of the shadow on the ground on a pole of height 18 m when angle of elevation θ of the Sun is such that tan θ = 6/7.

22) If $4x = cosec\theta$ and $\frac{4}{x} = \cot\theta$ find the value of $4\left[x^2 - \frac{1}{x^2}\right]$.

23) If $\sin\alpha = \frac{1}{2}$ then find the value of $3\sin\alpha - 4\sin^3\alpha$

24) If $k + 1 = \sec^2\theta\,(1 + \sin\theta)\,(1 - \sin\theta)$, then find the value of k.

25) Express the trigonometric ratio of sec A and tan A in terms of sin A.

26) Prove that : $\frac{(\sin^4\theta + \cos^4\theta)}{1 - 2\sin^2\theta\cos^2\theta} = 1$

27) A ladder 15 m long lean against a wall making an angle of 60° with the wall. Find the height of the point where the ladder touches the wall.

28) If the length of the ladder placed against a wall is twice the distance between the foot of the ladder and the wall. Find the angle made by the ladder with the horizontal.

29) An observer, 1.7 m tall, is 20.J3 m away from a tower.The angle of elevation from the eye of observer to the top of tower is.30°. Find the height of tower

30) If θ be an acute angle and 5cosec θ = 7, then evaluate $\sin\theta + \cos^2\theta - 1$

31) In the given figure, AB is a 6 m high pole and B is a ladder inclined at an angle of 60° to the horizontal and reaches up' to point D of pole. If AD = 2.54 m, find the length of the ladder,

32) An observer 1.5 m tall is 28.5 m away from a tower 30 m high. Find the angle of elevation of the top of the tower from his eye.

33) The angle of depression of a car parked on the road from the top of a 150 m high tower is 30°.Find the distance of the car from the tower (in m).

34) The height of a tower is 100m. When the angle of elevation of the Sun is 30°, then what will be the length of shadow of the tower?

35) The length of the shadow of a vertical pole is √3 times its height, find the Sun's altitude

36) If the shadow of a tower is 30 m long, when the Sun's elevation is 30°. What is the length of the shadow, when Sun's elevation is 60°?

37) A player sitting on the top ofa tower of height 20m observes the angle of depression of a ball lying on the ground as 60°. Find the distance between the foot of the tower and the ball.

38) Evaluate: $\frac{tan^2 60^\circ + 4sin^2 45^\circ + 3sec^2 30^\circ + 5cos^2 90^\circ}{cosec 30^\circ + sec 60^\circ - cot^2 30^\circ}$

39) If $\frac{cos\alpha}{cos\beta} = m$ and , show that $\frac{cos\alpha}{sin\beta} = n$ show that ($m^2 + n^2$) $\cos^2\beta = n^2$

40) If $\sqrt{3}\sin\theta = \cos\theta$, find the value of $\frac{\sin\theta\tan\theta(1+\cot\theta)}{\sin\theta+\cos\theta}$

41) If sin x + cos y = 1,x = 30° and y is an acute angle, find the value of y.

42) If m sin θ + n cos θ = p and m cos θ - n sin θ = q, Prove that $m^2 + n^2 = p^2 + q^2$.

43) If cos θ + sin θ = $\sqrt{2}$ cos θ, prove that cosθ - sin θ =$\sqrt{2}$ sin θ.

44) If4 tan θ = 3 evaluate $\left(\frac{4\sin\theta-\cos\theta+1}{4\sin\theta+\cos\theta-1}\right)$

45) If cosec (A - B) = 2, cot (A + B) = $\frac{1}{\sqrt{3}}$, $0^\circ < (A+B) \leq 90^\circ, A > B$ find A and B

46) Evaluate $5\sin^2 45° - \sec 60° \cot^2 30°$

47) Evaluate $\frac{\cos 45^\circ+\sin 60^\circ}{\sec 30^\circ+\text{cosec } 30^\circ}$

48) Evaluate $\frac{\sec^2 45^\circ-\tan^2 45^\circ}{\sin^2 45^\circ}$

49) Evaluate $\frac{5\tan 60^\circ}{(\sin^2 60^\circ+\cos^2 60^\circ)\tan 30^\circ}$

3 Marks 30 x 3 = 90

50) If sin (A – B) = $\frac{1}{2}$ cos (A + B) = $\frac{1}{2}$ 0° < A + B $\leq$ 90°, A > B, find A and B.

51) Given tan $A = \frac{4}{3}$, find the other trigonometric ratios of the angle A.

52) The angles of elevation and depression of the top and bottom of a light - house from the top of a 60 m high building are 30° and 60° respectively. Find
(i) the difference between the heights of the light - house and the building.
(ii) the distance between the light - house and the building.

53) A ladder of length 6 m makes an angle of 45° with the floor while leaning against one wall of a room. If the foot of the ladder is kept fixed on the floor and it is made to lean against the opposite wall of the room, it makes an angle of 60° with the floor. Find the distance between these two walls of the room.

54) The horizontal distance between two poles is 15 m. The angle of depression of the top of first pole as seen from the top of second pole is 30° . If the height of the second pole is 24 m, find the height of the first pole. $(Use\sqrt{3} = 1.732)$

55) A boy standing on a horizontal plane finds a bird flying at a distance of 100 m from him at an elevation of 30°. A girl standing on the roof of a 20 m high building, finds the elevation of the same bird to be 45°. The boy and the girl are on the opposite sides of the bird. Find the distance of the bird from the girl. [given √2 = 1.414]

56) The angle of elevation of a jet plane from a point A,on the ground is 60°. After a flight of 30s, the angle of elevation changes to 30°. If the jet plane is flying at a constant height of 3600√3 m, find the speed of the jet plane.

57) As observed from the top of a lighthouse, 100 m high above sea level, the angle of depression of a ship sailing directly towards it,changes from 30° to 60°. Determine the distance travelled by the ship during the period of observation. [take (√3 =1.732)]

58) If $m\cot A = n$, find the value of $\frac{m\sin A-n\cos A}{n\cos A+m\sin A}$

59) Evaluate $8\sqrt{3}cosec^2 30^0 \sin 60^0 \cos 60^0 cos^2 45^0 \sin 45^0 \tan 30^0 cosec^3 45^0$

60) If $2\cos 3\theta = \sqrt{3}$, find the value of θ .

61) What happens to value of $\tan\theta$ when θ increases from 0^0 to 90^0 ?

62) If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$,then show that $(m^2-n^2)^2 = 16\,mn$ or $(m^2-n^2) = 4\sqrt{mn}$.

63) If in a triangle ABC right angled at B, AB = 6 units and BC = 8 units, then find the value of sin A. cos C + cos A.sin C.

64) The horizontal distance between two poles is 15 m. The angle of depression of the top of first pole as seen from the top of second pole is 30°. If the height of the first pole is 24 m, find the height of the second pole. [Use $\sqrt{3}$ = 1.732]

65) A 1.6 m tall girl stands at a distance of 3.2 m from a lamp post and casts a shadow of 4.8 m on the ground. Find the height of the lamp post.

66) The angle of elevation of the top of a hill at the foot of a tower is 60° and the angle of elevation of the top of the tower from the foot of the hill is 30°. If the tower is 50 m high, find the height of the hill.

67) The angles of depression of the top and bottom of an 8 m tall building from top of a multi-storeyed building are 30° and 45°, respectively. Find the height of multi-storeyed building and distance between two buildings.

68) From a top of a building 100 m high the angle of depression of two objects are on the same side observed to be 45° and 60°. Find the distance between the objects.

69) A boy, flying a kite with a string of 90 m long, which is making an angle El with the ground. Find the height of the kite. $\left(Given \quad tan\theta = \frac{15}{8}\right)$

70) The angles of depression of the top and bottom of a 50 m high building from the top of a tower are 45° and 60° respectively. Find the height of the tower and the horizontal distance between the tower and the building. (Use √3 = 1.73)

71) An aeroplane, when flying at a height of 4000m from the ground passes vertically above another aeroplane at an instant when the angles of elevation of the two planes from the same point on the ground are 60°and 45° respectively.Find the vertical distance between the aeroplanes at that instant. (Take √3 = 1.73)

72) Two men on either side of a 75 m high building and in line with base of building observe the angles of elevation of the top of the building as 30° and 60°. Find the distance between the two men.(Use √3 = 1.73).

73) The horizontal distance between two towers is 60 m. The angle of elevation of the top of the taller tower as seen from the top of the shorter one is 30°. If the height of the taller tower is 150 m, them find the height of the shorter tower.

74) Two poles of equal heights are standing opposite to each other on either side of a road, which is 80 m wide. From a point between them on the road, angles of elevation of their top are 30° and 60°. Find the height of the poles and distance of point from poles.

75) If $\cos A = \frac{5}{13}$, then verify that $\frac{\cos A}{1-\tan A} + \frac{\sin A}{1-\cot A} = \cos A + \sin A$

76) Prove that $\frac{\sin A+\cos A}{\sin A-\cos A} + \frac{\sin A-\cos A}{\sin A+\cos A} = \frac{2}{2\sin^2 A-1}$

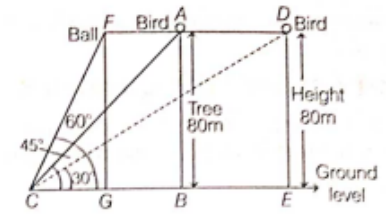
77) Prove that (cosec θ - sin θ) (sec θ - cos θ) (tan θ + cot θ) = 1

78) Prove that $\frac{\cot A-\cos A}{\cot A+\cos A} = \frac{\cos^2 A}{(1+\sin A)^2}$

79) Prove that $\frac{\cot\theta+\text{cosec}\,\theta-1}{\cot\theta-\text{cosec}\,\theta+1} = \frac{1+\cos\theta}{\sin\theta}$.

Case Study Questions 2 x 4 = 8

80) One evening, Kaushik was in a park. Children were playing cricket. Birds were singing on a nearby tree of height 80m. He observed a bird on the tree at an angle of elevation of 45°,
When a sixer was hit, a ball flew through the tree frightening the bird to fly away. In 2 s, he observed the bird flying at the same height at an angle of elevation of 30° and the ball flying tovwards him at the same height at an angle of elevation of 60°



(i) At what distance from the foot of the tree was he observing the bird sitting on the tree?
(ii) How far did the bird fly in the mentioned tirne?
Or After hitting the tree, how far did the ball travel in the sky when Kaushik saw the ballI?
(ii) What is the speed of the bird in m/min, if it had flown 2(√3 + 1) m?

81) If tan A = 3/4, then find the value of $\frac{1}{\sin A} + \frac{1}{\cos A}$.

5 Marks 43 x 5 = 215

82) From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45° and 60°. Find the height of the tower.

83) From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45°. Determine the height of the tower.

84) Prove the following identities, where the angles involved are acute angles for which the expressions are defined.
$(cosec\theta - \cot\theta)^2 = \frac{1-\cos\theta}{1+\cos\theta}$

85) Prove the following identities, where the angles involved are acute angles for which the expressions are defined.
$\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta cosec\theta$

86) Prove the following identities, where the angles involved are acute angles for which the expressions are defined.
$(\sin A + cosecA)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

87) If 3 cot A = 4, check whether $\frac{1-\tan^2 A}{1+\tan^2 A} = \cos^2 A - \sin^2 A$ or not.

88) As observed from the top of a light - house, 100 m high above sea level, the angle of depression of a ship, sailing directly towards it, changes from 30° to 60° . Determine the distance travelled by the ship during the period of observation. $(Use \sqrt{3} = 1.732)$

89) Two ships are there in the sea on either side of a lighthouse in such a way that the ships and the lighthouse are in the same straight line. The angles of depression of two ships as observed from the top of the lighthouse are 60° and 45°. If the height of the lighthouse is 200 m, find the distance between the two ships.

90) The angle of elevation of an aeroplane from a point A on the ground is 60° . After a flight of 30 seconds, the angle of elevation changes to 30° . If the plane is flying at a constant height of $3600\sqrt{3}$ m, find the speed in km/hr of the plane.

91) The angle of elevation of the top of a tower at a distance of 120 m from a point A on the ground is 45° . If the angle of elevation of the top of a flagstaff fixed at the top of the tower, from A is 60°, then the height of the flagstaff.
$[Use \sqrt{3} = 1.73]$

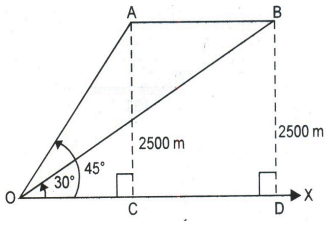
92) At a point A, 20 metres above the level of water in a lake, the angle of elevation of a cloud is 30° . The angle of depression of the reflection of the cloud in the lake, at A is 60° . Find the distance of the cloud from A.

93) From the top of a hill the angles of depression of two consecutive kilometre stones east are found to be 30° and 60° . Find the height of the hill.

94) The angle of elevation of the top of a hill at the foot of a tower is 60° and the angle of elevation of the tower from the foot of the hill is 30°.If the tower is 50m high, find the height of the hill.

95) The angles of depression of the top and bottom of a tower as seen from the top of a $60\sqrt{3}$ m high cliff are 45° and 60° respectively.Find the height of the tower.

96) The angle of elevation of an aeroplane from a point on the ground is 45°.After flying for 15 seconds, the angle of elevation changes to 30°. If the aeroplane is flying at a constant height of 2500m, find the average speed of the aeroplane.



97) The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°.

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99) A man on a cliff observesa boat at an angle of depression of 30° which is approaching the shore to the point immediately beneath the observer with a uniform speed. Six minutes later, the angle of depressions of the boat is found to be 60°. Find the time taken by the boat from here to reach the shore.

100) If 3 tan A = 4, prove that
(i) $\sqrt{\frac{\sec A - cosecA}{\sec A + cosecA}} = \frac{1}{\sqrt{7}}$.
(ii) $\sqrt{\frac{1-\sin A}{1+\cos A}} = \frac{1}{2\sqrt{2}}$.

101) If $\sqrt{3}\sin\theta = \cos\theta$, find the value of $\frac{\tan\theta(1+\cot\theta)}{\sin\theta+\cos\theta}$.

102) Prove that $(1 + \tan A + \cot A)(\sin A - \cos A) = \sin A \tan A - \cos A \cot A$

103) If sin (A + B) = 1 and sin (A - B)= $\frac{1}{2}; 0 \leq A + B \leq 90^0$ and A > B, find the value of A and B.

104) Prove that $\frac{1-\cos A+\sin A}{\sin A+\cos A-1} = \frac{1+\sin A}{\cos A}$.

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

106) Prove that $\sqrt{\frac{\sin A+1}{1-\sin A}}+\sqrt{\frac{1-\sin A}{\sin A+1}}=2\sec A.$

107) Prove that $\sec^2\theta-\frac{\sin^2\theta-2\sin^4\theta}{2\cos^4\theta-\cos^2\theta}=1$

108) Prove that $(\tan\theta+\sec\theta-1)(\tan\theta+1+\sec\theta)=\frac{2\sin\theta}{1-\sin\theta}$

109) Evaluate : $\tan^2 30°\sin 30°+\cos 60°\sin^2 90°\tan^2 60°-2\tan 45°\cos^2 0°\sin 90°$

110) If $cosec\theta-\cot\theta=\sqrt{2}\cot\theta$, then prove that $cosec\theta+\cot\theta=\sqrt{2}\,cosec\theta$

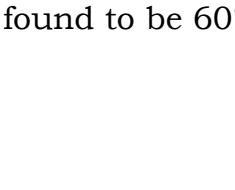
111) Prove that : $\sqrt{\frac{\sec\theta-1}{\sec\theta+1}}+\sqrt{\frac{\sec\theta+1}{\sec\theta-1}}=2cosec\theta$

112) If $cosec\theta+\cot\theta=p$, then prove that $\cos\theta=\frac{p^2-1}{p^2+1}$

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

114) If sin A = $\frac{\sqrt{3}}{2}$, find the value of 2 $\cot^2$ A - 1.

115) In figure, $\triangle$ PQR right angled at Q. PQ = 6 cm, PR = 12 cm, Determine $\angle$QPR = $\angle$PRQ.



116) Prove that $\frac{\tan\theta}{1-\tan\theta}-\frac{\cot\theta}{1-\cot\theta}=\frac{\cos\theta+\sin\theta}{\cos\theta-\sin\theta}$

117) Prove that $\frac{\sin A-2\sin^3 A}{2\cos^3 A-\cos A}=\tan A$

118) If sec A = $\frac{17}{8}$ show that $\frac{3-4\sin^2 A}{4\cos^2 A-3}=\frac{3-\tan^2 A}{1-3\tan^2 A}$

119) Prove that $\frac{\cot A+\operatorname{cosec} A-1}{\cot A-\operatorname{cosec} A+1}=\frac{1+\cos A}{\sin A}$

120) If cosec A - cot A = q, show that $\frac{q^2-1}{q^2+1}+\cos A=0$

121) Prove that 2 $\sec^2\theta$ - $\sec^4\theta$ - 2 $\operatorname{cosec}^2\theta$ + $\operatorname{cosec}^4\theta$ = $\cot^4\theta$ - $\tan^4\theta$.

122) Prove that $\left(\tan\theta+\frac{1}{\cos\theta}\right)^2+\left(\tan\theta-\frac{1}{\cos\theta}\right)^2=2\left(\frac{1+\sin^2\theta}{1-\sin^2\theta}\right)$

123) The angle of elevation of a jet plane from a point A on the ground is 60°. After a flight of 30 sec, the angle of elevation changes to 30°. If the jet plane is flying at a constant height of 3600 $\sqrt{3}$ m, find the speed of the jet plane.

124) A man on a cliff observes a boat at an angle of depression of 30° which is approaching the shore to the point immediately beneath the observer with a uniform speed. Six minutes later, the angle of depressions of the boat is found to be 60°. Find the time taken by the boat from here to reach the shore.

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