

CHAPTER 9

Some Applications of Trigonometry

OBJECTIVE QUESTIONS

QUESTION 1.

If the angle of depression of an object from a 75 m high tower is 30° , then the distance of the object from the tower is

- (a) $25\sqrt{3}$ m (b) $50\sqrt{3}$ m
(c) $75\sqrt{3}$ m (d) 150 m

Sol :

[View Answer](#)

QUESTION 2.

A tree casts a shadow 15 m long on the level of ground, when the angle of elevation of the sun is 45° . The height of a tree is

- (a) 10 m (b) 14 m
(c) 8 m (d) 15 m

Sol :

[View Answer](#)

QUESTION 3.

If the height and length of the shadow of a man are equal, then the angle of elevation of the sun is,

- (a) 45° (b) 60°
(c) 90° (d) 120°

Sol :

[View Answer](#)

QUESTION 4.

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

- (a) 90° (b) 45°
(c) 30° (d) 75°

Sol :

[View Answer](#)

QUESTION 5.

A 6 m high tree cast a 4 m long shadow. At the same time, a flag pole cast a shadow 50 m long. How long is the flag pole?

- (a) 75 m (b) 100 m
(c) 150 m (d) 50 m

Sol :

[View Answer](#)

QUESTION 6.

A tree is broken by the wind. The top struck the ground at an angle of 30° and at distance of 10 m from its root. The whole height of the tree is ($\sqrt{3} = 1.732$)

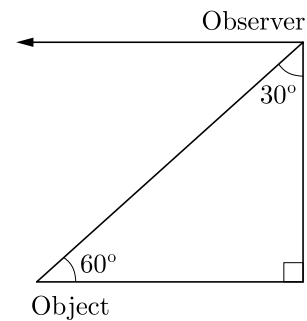
- (a) $10\sqrt{3}$ m (b) $3\sqrt{10}$ m
(c) $20\sqrt{3}$ m (d) $3\sqrt{20}$ m

Sol :

[View Answer](#)

QUESTION 7.

In the given figure, the positions of the observer and the object are mentioned, the angle of depression is



- (a) 30° (b) 90°
(c) 60° (d) 45°

Sol :

[View Answer](#)

QUESTION 8.

A circle artist is climbing a 20 m long rope, which is tightly stretched and tied from the top of a vertical pole to the ground, then the height of pole, if the angle made by the rope with the ground level is 30° , is

- (a) 5 m (b) 10 m
(c) 15 m (d) 20 m

Sol :

[View Answer](#)

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QUESTION 9.

The length of a string between a kite and a point on the ground is 85 m. If the string makes an angle θ with level ground such that $\tan\theta = \frac{15}{8}$, then the height of kite is

- (a) 75 m (b) 78.05 m
(c) 226 m (d) None of these

Sol :

View Answer**QUESTION 10.**

The top of two poles of height 20 m and 14 m are connected by a wire. If the wire makes an angle of 30° with the horizontal, then the length of the wire is

- (a) 12 m (b) 10 m
(c) 8 m (d) 6 m

Sol :

View Answer**QUESTION 11.**

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

- (a) 30° (b) 45°
(c) 60° (d) 90°

Sol :

View Answer

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QUESTION 12.

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° , then the height of the tower is

- (a) 14.124 m (b) 17.124 m
(c) 19.124 m (d) 15.124 m

Sol :

View Answer**QUESTION 13.**

The angles of elevation of the top of a tower from the points P and Q at distance of a and b respectively from the base and in the same straight line with it, are complementary. The height of the tower is

- (a) ab (b) \sqrt{ab}
(c) $\sqrt{\frac{a}{b}}$ (d) $\sqrt{\frac{b}{a}}$

Sol :

View Answer**QUESTION 14.**

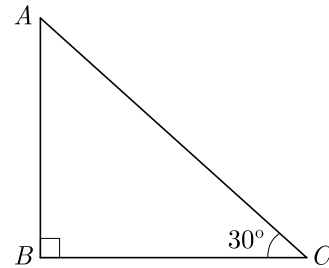
From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively, then the height of the tower is

- (a) 14.64 m (b) 28.64 m
(c) 38.64 m (d) 19.64 m

Sol :

View Answer**QUESTION 15.**

Assertion : In the figure, if $BC = 20$ m, then height AB is 11.56 m.



Reason : $\tan\theta = \frac{AB}{BC} = \frac{\text{perpendicular}}{\text{base}}$ where θ is the angle $\angle ACB$.

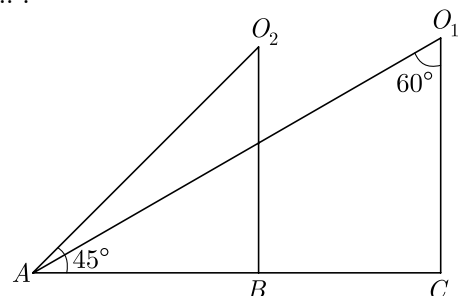
- (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

Sol :

View Answer**ONE MARK QUESTIONS****QUESTION 16.**

[Board 2020 OD Standard]

In Figure, the angles of depressions from the observing positions O_1 and O_2 respectively of the object A are



Sol :

View Answer

QUESTION 17.

The is the line drawn from the eye of an observer to the point in the object viewed by the observer.

Sol : [View Answer](#)

QUESTION 18.

[Board Term-2 Foreign 2015]

The of an object viewed, is the angle formed by the line of sight with the horizontal when it is above the horizontal level, i.e., the case when we raise our head to look at the object.

Sol : [View Answer](#)

QUESTION 19.

[Board Term-2 Foreign 2015]

The of an object viewed, is the angle formed by the line of sight with the horizontal when it is below the horizontal level, i.e., the case when we lower our head to look at the object.

Sol : [View Answer](#)

QUESTION 20.

[Board Term-2 2011]

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.

Sol : [View Answer](#)

QUESTION 21.

[Board Term-2 Delhi 2011]

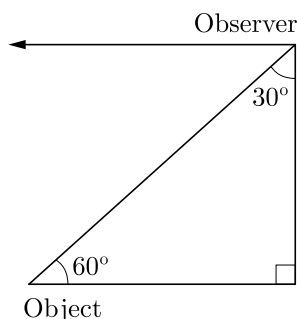
A tree casts a shadow 15 m long on the level of ground, when the angle of elevation of the sun is 45° . Find the height of a tree.

Sol : [View Answer](#)

QUESTION 22.

[Board Term-2 OD 2015]

In the given figure, the positions of the observer and the object are mentioned, find the angle of depression?

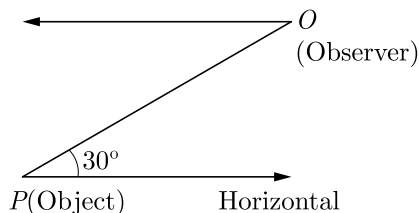


Sol :

QUESTION 23.

[Board 2008]

In the adjoining figure, the positions of observer and object are marked. The angle of depression is



Sol : [View Answer](#)

QUESTION 24.

[Board Term-2 OD 2017]

If the angle of depression of an object from a 75 m high tower is 30° , then what is the distance of the object from the tower?

Sol : [View Answer](#)

QUESTION 25.

[Board Term-2 OD 2016]

If the height and length of the shadow of a man are equal, then find the angle of elevation of the sun.

Sol : [View Answer](#)
[View Answer](#)

QUESTION 26.

[Board Term-2 Delhi 2013]

A circus artist is climbing a 20 m long rope, which is tightly stretched and tied from the top of a vertical pole to the ground. If the angle made by the rope with the ground level is 30° , then what is the height of pole?

Sol : [View Answer](#)

QUESTION 27.

[Board Term-2 Foreign 2014]

The top of two poles of height 20 m and 14 m are connected by a wire. If the wire makes an angle of 30° with the horizontal, then find the length of the wire.

Sol : [View Answer](#)

QUESTION 28.

[Board Term-2 Delhi 2012]

The ratio of the length of a rod and its shadow is $1 : \sqrt{3}$ then what is the angle of elevation of the sun ?

Sol : [View Answer](#)

QUESTION 29.

[Board Term-2, 2016]

The ratio of the height of a tower and the length of its shadow on the ground is $\sqrt{3} : 1$. What is the angle of elevation of the sun ?

Sol : [View Answer](#)

QUESTION 30.

[Board Term-2 2014]

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

Sol :

[View Answer](#)**QUESTION 31.**

[Board Term-2 Foreign 2015]

A pole casts a shadow of length $2\sqrt{3}$ m on the ground, when the Sun's elevation is 60° . Find the height of the pole.

Sol :

[View Answer](#)**QUESTION 32.**

[Board Term-2 2015]

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.

Sol :

[View Answer](#)**QUESTION 33.**

[Board Term-2 Foreign 2016]

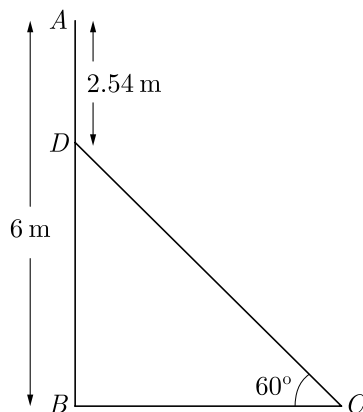
An observer, 1.7 m tall, is $20\sqrt{3}$ m away from a tower. The angle of elevation from the eye of observer to the top of tower is 30° . Find the height of tower.

Sol :

[View Answer](#)**QUESTION 34.**

[Board Term-2 Delhi 2016]

In the given figure, AB is a 6 m high pole and DC 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 ladder. (use $\sqrt{3} = 1.73$)



Sol :

[View Answer](#)**QUESTION 35.**

[Board Term-2 2012]

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.

Sol :

[View Answer](#)**QUESTION 36.**

[Board Term-2 2014]

If the angles of elevation of the top of a tower from two points distant a and b ($a > b$) from its foot and in the same straight line from it are respectively 30° and 60° , then find the height of the tower.

Sol :

[View Answer](#)**QUESTION 37.**

[Board Term-2, 2014]

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).

Sol :

[View Answer](#)**QUESTION 38.**

[Board Term-2 2012]

A pole 6 m high casts a shadow $2\sqrt{3}$ m long on the ground, then find the Sun's elevation.

Sol :

[View Answer](#)**QUESTION 39.**

[Board Term-2 OD 2017]

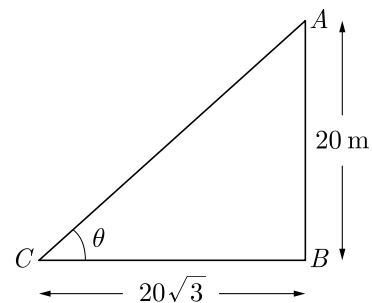
If a tower 30 m high, casts a shadow $10\sqrt{3}$ m long on the ground, then what is the angle of elevation of the sun ?

Sol :

[View Answer](#)**QUESTION 40.**

[Board Term-2 OD 2015]

In figure, a tower AB is 20 m high and BC , its shadow on the ground, is $20\sqrt{3}$ m long. find the Sun's altitude.



Sol :

[View Answer](#)**QUESTION 41.**

[Board Term-2 2012]

Find the angle of elevation of the top of the tower from the point on the ground which is 30 m away from the foot of the tower of height $10\sqrt{3}$ m.

Sol :

[View Answer](#)

QUESTION 42.

[Board Term-2 2011]

If the altitude of the sun is 60° , what is the height of a tower which casts a shadow of length 30 m ?

Sol :

[View Answer](#)**FOR 30 FREE SAMPLE PAPERS SET FOR ALL SUBJECTS****DOWNLOAD NODIA APP****TWO MARKS QUESTIONS****QUESTION 43.**

[Board Term-2 2015]

From the top of light house, 40 m above the water, the angle of depression of a small boat is 60° . Find how far the boat is from the base of the light house.

Sol :

[View Answer](#)**QUESTION 44.**

[Board Term-2 2011, 2014]

A kite is flying at a height of 90 m above the ground. The string attached 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.

Sol :

[View Answer](#)**QUESTION 45.**

[Board Term-2, 2012]

Find the length of kite string flying at 100 m above the ground with the elevation of 60° .

Sol :

[View Answer](#)**QUESTION 46.**

[Board Term-2 2011]

A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle 30° with it. The distance between the foot of the tree to the point where the top touches the ground is 8 m. Find the height of the tree.

Sol :

[View Answer](#)**QUESTION 47.**

[Board Term-2 2011]

A player sitting on the top of a tower of height 20 m 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. Take $\sqrt{3} = 1.732$

Sol :

[View Answer](#)**QUESTION 48.**

[Board Term-2 2011]

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° ?

Sol :

[View Answer](#)**QUESTION 49.**

[Board Term-2 2011, Delhi 2012, 2013]

From a point P on the ground the angle of elevation of the top of a 10 m tall building is 30° . A flag is hoisted at the top of the building and the angle of elevation of the length of the flagstaff from P is 45° . Find the length of the flagstaff and distance of building from point P . [Take $\sqrt{3} = 1.732$]

Sol :

[View Answer](#)**THREE MARKS QUESTIONS****QUESTION 50.**

[Board 2020 OD Standard]

The angle of elevation of the top of a building from the foot of a tower is 30° and the angle of elevation of the top of a tower from the foot of the building is 60° . If the tower is 50 m high, then find the height of the building.

Sol :

[View Answer](#)**QUESTION 51.**

[Board 2020 Delhi Basic, Delhi 2013]

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° . If the tower is 60 m high, find the height of the building.

Sol :

[View Answer](#)**QUESTION 52.**

[Board Term-2 Delhi 2015]

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.

Sol :

[View Answer](#)**QUESTION 53.**

[Board Term-2 2012]

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.

Sol :

[View Answer](#)

QUESTION 54.

[Board Term-2, 2012]

The top of two poles of height 16 m and 10 m are connected by a length l meter. If wire makes an angle of 30° with the horizontal, then find l .

Sol :

[View Answer](#)**QUESTION 55.**

[Board Term-2 2016]

An electric pole is 10 m high. A steel wire tied to top of the pole is affixed at a point on the ground to keep the pole up right. If the wire makes an angle of 45° with the horizontal through the foot of the pole, find the length of the wire. [Use $\sqrt{2} = 1.414$]

Sol :

[View Answer](#)**QUESTION 56.**

[Board Term-2 Delhi 2016]

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 $\sqrt{3} = 1.73$)

Sol :

[View Answer](#)**QUESTION 57.**

[Board Term-2 Foreign 2016]

An aeroplane, when flying at a height of 4000 m 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. (Use $\sqrt{3} = 1.73$)

Sol :

[View Answer](#)**QUESTION 58.**

[Board Term-2 Foreign 2016]

A 7 m long flagstaff is fixed on the top of a tower standing on the horizontal plane. From point on the ground, the angles of elevation of the top and bottom of the flagstaff are 60° and 45° respectively. Find the height of the tower correct to one place of decimal. (Use $\sqrt{3} = 1.73$)

Sol :

[View Answer](#)**QUESTION 59.**

[Board Term-2 Foreign 2016]

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 $\sqrt{3} = 1.73$)

Sol :

[View Answer](#)**QUESTION 60.**

[Board Term-2 OD 2013]

Two men standing on opposite sides of a tower measure the angles of elevation of the top of the tower as 30° and 60° respectively. If the height of the tower is 20 m, then find the distance between the two men.

Sol :

[View Answer](#)**QUESTION 61.**

[Board Term-2 OD 2014]

A boy, flying a kite with a string of 90 m long, which is making an angle θ with the ground. Find the height of the kite. (Given $\tan\theta = \frac{45}{8}$)

Sol :

[View Answer](#)

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QUESTION 62.

[Board Term-2 OD 2016]

A man standing on the deck of a ship, which is 10 m above water level, observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of hill as 30° . Find the distance of the hill from the ship and the height of the hill.

Sol :

[View Answer](#)**QUESTION 63.**

[Board Term-2 Foreign 2014]

Two ships are approaching a light house from opposite directions. The angle of depression of two ships from top of the light house are 30° and 45° . If the distance between two ships is 100 m, Find the height of light-house.

Sol :

[View Answer](#)**QUESTION 64.**

[Board Term-2 2013]

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 of the pole is 24 m, find the height of the second pole. [Use $\sqrt{3} = 1.732$]

Sol :

[View Answer](#)**QUESTION 65.**

[Board Term-2 2015]

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, then find the height of the shorter tower.

Sol :

[View Answer](#)

QUESTION 66.

[Board Term-2 2012]

The angle of elevation of the top of a tower from a point A on the ground is 30° . On moving a distance of 20 metre towards the foot of the tower to a point B the angle of elevation increase to 60° . Find the height of the tower and the distance of the tower from the point A .

Sol :

[View Answer](#)**QUESTION 67.**

[Board Term-2 2012]

A person observed the angle of elevation of the top of a tower as 30° . He walked 50 m towards the foot of the tower along level ground and found the angle of elevation of the top of the tower as 60° . Find the height of the tower.

Sol :

[View Answer](#)**QUESTION 68.**

[Board Term-2 Foreign 2017]

The shadow of a tower at a time is three times as long as its shadow when the angle of elevation of the sun is 60° . Find the angle of elevation of the sun at the of the longer shadow.

Sol :

[View Answer](#)**QUESTION 69.**

[Board Term-2 OD 2012]

A statue 1.6 m tall stands on the top of a pedestal. From a point on the ground the angle of elevation of the top of the statue is 60° and from the same point the angle of elevation of the top of the pedestal is 45° . Find the height of the pedestal.

Sol :

[View Answer](#)**QUESTION 70.**

[Board Term-2 OD 2017]

On a straight line passing through the foot of a tower, two C and D are at distance of 4 m and 16 m from the foot respectively. If the angles of elevation from C and D of the top of the tower are complementary, then find the height of the tower.

Sol :

[View Answer](#)**FIVE MARKS QUESTIONS****QUESTION 71.**

[Board Term-2 OD 2014]

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-storey building and distance between two buildings.

Sol :

[View Answer](#)**QUESTION 72.**

[Board Term-2 SQP 2018]

The angle of depression of the top and bottom of a building 50 metres high as observed from the top of a tower are 30° and 45° respectively. Find the height of the tower and also the horizontal distance between the building and the tower.

Sol :

[View Answer](#)**QUESTION 73.**

[Board Term-2 2011, 2012, OD 2014]

From the top of a building 60 m high the angles of depression of the top and the bottom of a tower are observed to be 30° and 60° . Find the height of the tower.

Sol :

[View Answer](#)**QUESTION 74.**

[Board 2020 SQP Standard, 2014]

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.

Sol :

[View Answer](#)**QUESTION 75.**

[Board Term-2 OD 2015]

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 changed 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.

Sol :

[View Answer](#)**QUESTION 76.**

[Board 2020 OD Basic]

The person standing on the bank of river observes that the angle of elevation of the top of a tree standing on opposite bank is 60° . When he moves 30 m away from the bank, he finds the angle of elevation to be 30° . Find the height of tree and width of the river.

Sol :

[View Answer](#)**QUESTION 77.**

[Board Term-2 OD 2012]

A person standing on the bank of a river, observes that the angle of elevation of the top of the tree standing on the opposite bank is 60° . When he retreats 20 m from the bank, he finds the angle of elevation to be 30° . Find the height of the tree and the breadth of the river.

Sol :

[View Answer](#)

QUESTION 78.

[Board Term-2 Delhi 2017]

An observer finds the angle of elevation of the top of the tower from a certain point on the ground as 30° . If the observer moves 20 m, towards the base of the tower, the angle of elevation of the top increase by 15° , find the height of the tower.

Sol :

[View Answer](#)**QUESTION 79.**

[Board 2020 Delhi Standard]

A vertical tower stands on horizontal plane and is surmounted by a vertical flag-staff of height 6 m. At a point on the ground, angle of elevation of the bottom and top of the flag-staff are 30° and 45° respectively. Find the height of the tower. (Take $\sqrt{3} = 1.73$)

Sol :

[View Answer](#)**QUESTION 80.**

[Board 2019 OD Standard]

From a point P on the ground, the angle of elevation of the top of a tower is 30° and that of the top of the flagstaff is 45° . If height of flagstaff is 5 m, find the height of the tower. (Use $\sqrt{3} = 1.732$)

Sol :

[View Answer](#)**QUESTION 81.**

[Board Term-2 OD 2014]

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

Sol :

[View Answer](#)**QUESTION 82.**

[Board 2020 OD Standard]

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

Sol :

[View Answer](#)**QUESTION 83.**

[Board Term-2 OD Compt. 2017]

From a point P on the ground, the angles of elevation of the top of a 10 m tall building and a helicopter, hovering at some height vertically over the top of the building are 30° and 60° respectively. Find the height of the helicopter above the ground.

Sol :

[View Answer](#)**QUESTION 84.**

[Board 2020 Delhi Standard]

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

Sol :

[View Answer](#)**QUESTION 85.**

[Board Term-2 Foreign 2013]

From the top of a 7 m high building, the angle of elevation of the top of a tower is 60° and the angle of depression of its foot is 45° . Find the height of the tower. (Use $\sqrt{3} = 1.732$)

Sol :

[View Answer](#)**QUESTION 86.**

[Board 2019 OD]

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

Sol :

[View Answer](#)

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QUESTION 87.

[Board 2019 Delhi, OD 2011]

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.

Sol :

[View Answer](#)**QUESTION 88.**

[Board 2019 OD]

Amit, standing on a horizontal plane, find a bird flying at a distance of 200 m from him at an elevation of 30° . Deepak standing on the roof of a 50 m high building, find the angle of elevation of the same bird to be 45° . Amit and Deepak are on opposite sides of the bird. Find the distance of the bird from Deepak.

Sol :

[View Answer](#)**QUESTION 89.**

[Board Term-2 OD 2014]

A boy observes that the angle of elevation of a bird flying at a distance of 100 m is 30° . At the same distance from the boy, a girl finds the angle of elevation of the same bird from a building 20 m high is 45° . Find the distance of the bird from the girl.

Sol :

[View Answer](#)

QUESTION 90.

[Board 2018]

As observed from the top of a 100 m high light house from the sea-level, the angles of depression of two ships are 30° and 45° . If one ship is exactly behind the other on the same side of the light house, find the distance between the two ships [Use $\sqrt{3} = 1.732$]

Sol :

[View Answer](#)**QUESTION 91.**

[Board Term-2 OD 2014]

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.

Sol :

[View Answer](#)**QUESTION 92.**

[Board Term-2 SQP 2016]

From the top of tower, 100 m high, a man observes two cars on the opposite sides of the tower with the angles of depression 30° and 45° respectively. Find the distance between the cars. (Use $\sqrt{3} = 1.73$)

Sol :

[View Answer](#)**FOR 30 FREE SAMPLE PAPERS SET FOR ALL SUBJECTS****DOWNLOAD NODIA APP****QUESTION 93.**

[Delhi Compt. Set-III, II, 2017]

From the top of a 120 m high tower, a man observes two cars on the opposite sides of the tower and in straight line with the base of tower with angles of depression as 60° and 45° . Find the distance between two cars.

Sol :

[View Answer](#)**QUESTION 94.**

[Board Term-2 OD 2016]

Hence the distance between two men is 189.28 m. The angle of elevation of the top B of a tower AB from a point X on the ground is 60° . At point Y , 40 m vertically above X , the angle of elevation of the top is 45° . Find the height of the tower AB and the distance XB .

Sol :

[View Answer](#)**QUESTION 95.**

[Board Term-2 Foreign 2016]

A vertical tower stands on a horizontal plane and is surmounted by a flagstaff of height 5 m. From a point on the ground the angles of elevation of top and bottom of the flagstaff are 60° and 30° respectively. Find the height of the tower and the distance of the point from the tower. (take $\sqrt{3} = 1.732$)

Sol :

[View Answer](#)**QUESTION 96.**

[Board Term-2 Foreign 2015]

Two post are k metre apart and the height of one is double that of the other. If from the mid-point of the line segment joining their feet, an observer finds the angles of elevation of their tops to be complementary, then find the height of the shorter post.

Sol :

[View Answer](#)**QUESTION 97.**

[Board Term-2 OD 2014]

A man on the top of a vertical tower observes a car moving at a uniform speed towards him. If it takes 12 min. for the angle of depression to change from 30° to 45° , how soon after this, the car will reach the tower ?

Sol :

[View Answer](#)**QUESTION 98.**

[Board Term-2 OD 2016]

As observed from the top of a light house, 100 m high above sea level, the angles of depression of a ship, sailing directly towards it, changes from 30° to 60° . Find the distance travelled by the ship during the period of observation. (Use $\sqrt{3} = 1.73$)

Sol :

[View Answer](#)**QUESTION 99.**

[Board Term-2 Delhi Compt. 2017]

A straight highway leads to the foot of a tower. A man standing on its top observes a car at an angle of depression of 30° , which is approaching the foot of the tower with a uniform speed. 6 seconds later, the angle of depression of the car becomes 60° . Find the time taken by the car to reach the foot of tower from this point.

Sol :

[View Answer](#)**QUESTION 100.**

[Board Term-2 OD 2017]

Two points A and B are on the same side of a tower and in the same straight line with its base. The angle of depression of these points from the top of the tower are 60° and 45° respectively. If the height of the tower is 15 m, then find the distance between these points.

Sol :

[View Answer](#)**QUESTION 101.**

[Board Term-2 OD 2016]

From the top of a hill, the angle of depression of two consecutive kilometre stones due east are found to be 45° and 30° respectively. Find the height of the hill. [Use $\sqrt{3} = 1.73$]

Sol :

[View Answer](#)

QUESTION 102.

[Board Term-2 Foreign 2017]

The angle of depression of two ships from an aeroplane flying at the height of 7500 m are 30° and 45° . If both the ships are in the same line that one ship is exactly behind the other, find the distance between the ships.

Sol :

[View Answer](#)**QUESTION 103.**

[Board Term-2 OD 2017]

An aeroplane is flying at a height of 300 m above the ground. Flying at this height the angle of depression from the aeroplane of two points on both banks of a river respectively. Find the width of the river. River in opposite direction are 45° and 60° .

Sol :

[View Answer](#)**QUESTION 104.**

[Board Term-2 OD 2012]

The angle of elevation of a cloud from a point 120 m above a lake is 30° and the angle of depression of its reflection in the lake is 60° . Find the height of the cloud.

Sol :

[View Answer](#)**QUESTION 105.**

[Board Term-2 Delhi 2017]

An angle of elevation of a cloud from a point 60 m above the surface of the water of a lake is 30° and the angle of depression of its shadow in water is 60° . Find the height of the cloud from the surface of water.

Sol :

[View Answer](#)**QUESTION 106.**

[Board Term-2 OD 2015]

At a point A , 20 metre 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 ?

Sol :

[View Answer](#)**QUESTION 107.**

[Board Term-2 OD 2015]

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 $x : y$.

Sol :

[View Answer](#)**QUESTION 108.**

[Board Term-2 Delhi 2012]

The angle of elevation of a jet fighter point A on ground is 60° . After flying 10 seconds, the angle changes to 30° . If the jet is flying at a speed of 648 km/hour, find the constant height at which the jet is flying.

Sol :

[View Answer](#)**QUESTION 109.**

[Board Term-2 Foreign 2015]

From the top of a tower of height 50 m, the angles of depression of the top and bottom of a pole are 30° and 45° respectively. Find :

- (1) How far the pole is from the bottom of the tower,
- (2) The height of the pole. (Use $\sqrt{3} = 1.732$)

Sol :

[View Answer](#)**QUESTION 110.**

[Board Term-2 OD 2011]

The shadow of a tower standing on a level ground is found to be 40 m longer when the Sun's altitude is 30° , then when it is 60° . Find the height of the tower.

Sol :

[View Answer](#)**QUESTION 111.**

[Board 2019 Delhi]

A man in a boat rowing away from a light house 100 m high takes 2 minutes to change the angle of elevation of the top of the light house from 60° to 30° . Find the speed of the boat in metres per minute. [Use $\sqrt{3} = 1.732$]

Sol :

[View Answer](#)**QUESTION 112.**

[Board Term-2 Delhi 2017]

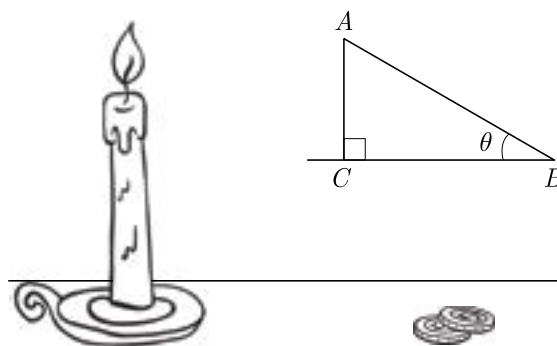
A moving boat observed from the top of a 150 m high cliff moving away from the cliff. The angle of depression of the boat changes from 60° to 45° in 2 minutes. Find the speed of the boat.

Sol :

[View Answer](#)**QUESTION 113.**

[Board SQP Standard 2021]

If the angles of elevation of the top of the candle from two coins distant a cm and b cm ($a > b$) from its base and in the same straight line from it are 30° and 60° , then find the height of the candle.



If the angles of elevation of the top of the candle from two coins distant ' a ' cm and ' b ' cm ($a > b$) from its base and in the same straight line from it are 30° and 60° , then find the height of the candle.

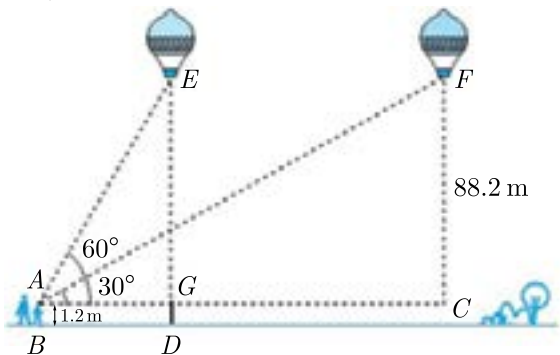
Sol :

[View Answer](#)

QUESTION 114.

[Board SQP Basic 2021]

A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60° . After sometime, the angle of elevation reduces 30° . Find the distance travelled by the balloon during the interval.



Sol :

[View Answer](#)

QUESTION 115.

[Board Term-2 Delhi 2016]

A bird sitting on the top of a 80 m high tree. From a point on the ground, the angle of elevation of the bird is 45° . The bird flies away horizontally in such a way that it remained at a constant height from the ground. After 2 seconds, the angle of elevation of the bird from the same point is 30° . Find the speed of flying of the bird. (Take $\sqrt{3} = 1.732$)

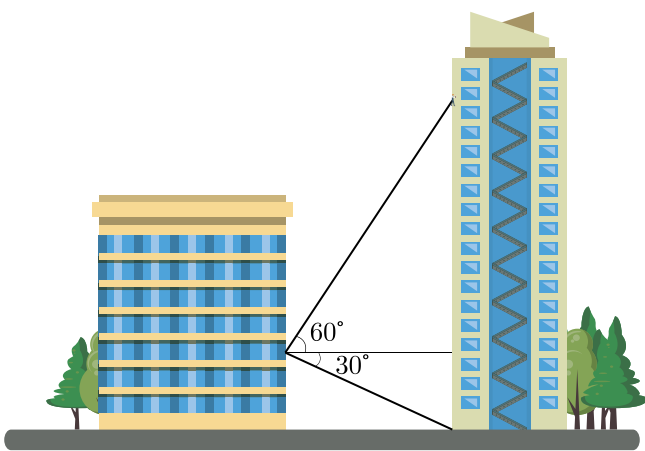
Sol :

[View Answer](#)

COMPETENCY BASED QUESTIONS

QUESTION 116.

From his hotel room window on the fourth floor, Ranjan notices some window washers high above him on the hotel across the street.



Curious as to their height above ground, he quickly estimates the buildings are 60 m apart, the angle of elevation to the workers is about 60° , and the angle of depression to the base of the hotel is about 30° .

- (i) How high above ground is the window of Ranjan’s hotel room?
- (ii) How high above ground are the workers?

Sol :

[View Answer](#)

QUESTION 117.

Statue of Unity : It is a colossal statue of Indian statesman and independence activist Sardar Vallabh bhai Patel, who was the first Deputy Prime Minister and Home minister of independent India.



Patel was highly respected for his leadership in uniting the 562 princely states of India to form the single Union of India. It is located in the state of Gujarat and it is the world’s tallest statue.

- (i) For a person standing 240 m from the center of the base of the statue, the angle of elevation to the top of the statue is 45° . How tall is the statue?
- (ii) A cop in helicopter near the top of the statue, notices a car wreck some distance from the statue. If the angle of depression from the cop’s eyes to the wreck is 60° , how far away is the accident from the centre of base of the statue?

Sol :

[View Answer](#)

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QUESTION 118.

Eiffel Tower : The Eiffel Tower is a landmark and an early example of wrought-iron construction on a gigantic scale. The lower section consists of four immense arched legs set on masonry piers. The legs curve inward until they unite in a single tapered tower. Platforms, each with an observation deck, are at three levels; on the first is also a restaurant.

The tower, constructed of about 7000 tons of iron, has stairs and elevators. A meteorological station, a radio communications station, and a television transmission antenna, as well as a suite of rooms that were used by Eiffel are located near the top of the tower.



- (i) For a person standing 324 m from the center of the base of the Eiffel Tower, the angle of elevation to the top of the tower is 45° . How tall is the Eiffel Tower?
- (ii) A car is moving at uniform speed towards the Eiffel tower. It takes 15 minutes for the angle of depression from the top of tower to the car to change from 30° to 60° . After how much time after this, the car will reach the base of the tower?

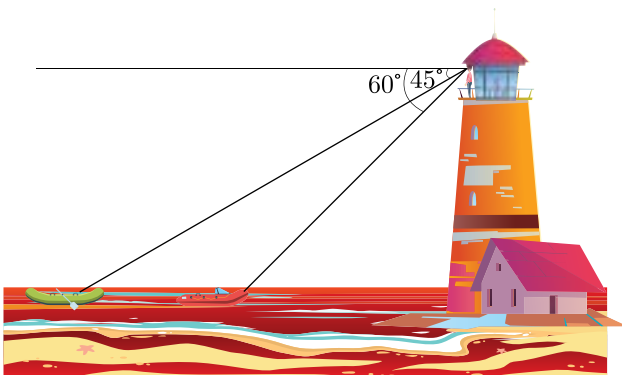
Sol : [View Answer](#)

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QUESTION 119.

From the observation deck of a seaside building 200 m high, Jignesh sees two fishing boats in the distance. The angle of depression to the nearer boat is 60° while for the boat farther away the angle is 45° .

- (i) How far out to sea is the nearer boat?
- (ii) How far apart are the two boats?



Sol : [View Answer](#)

QUESTION 120.

While doing some night fishing, Sarthak round a peninsula and a tall light house comes into view. Taking a sighting, Sarthak find the angle of elevation to the top of the lighthouse is 30° . If the lighthouse is known to be 25 m tall, how far

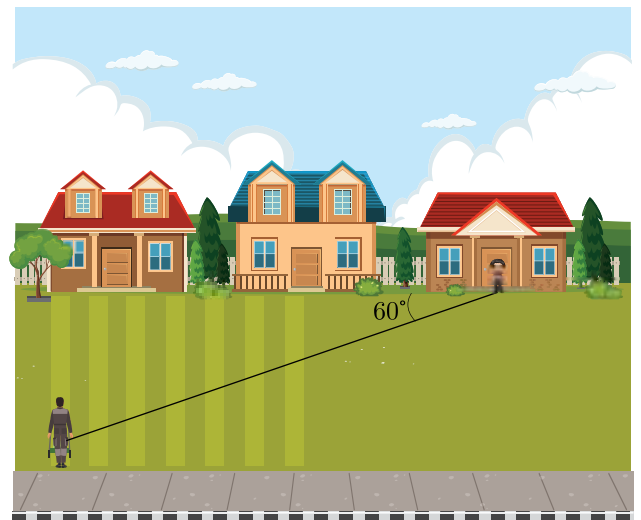
from the lighthouse is Sarthak ?



Sol : [View Answer](#)

QUESTION 121.

On a warm and lazy Saturday, Rishi is watching a county maintenance crew mow the park across the street. He notices the mower takes 16 sec to pass through 60° of rotation from one end of the park to the other.



If the corner of the park is 40 meter directly across the street from his house,

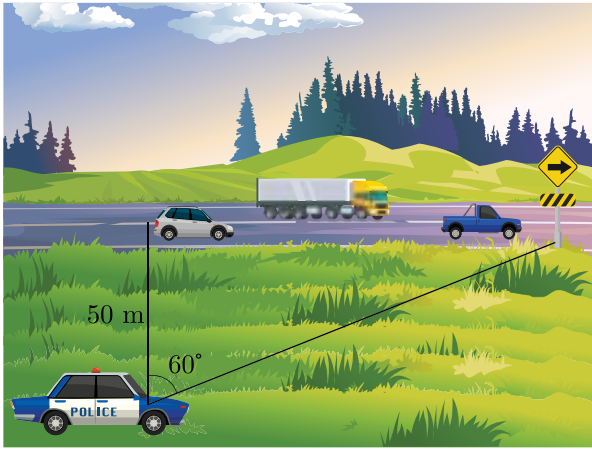
- (i) How wide is the park?
- (ii) How fast (in kmph) does the mower travel as it cuts the grass?

Sol : [View Answer](#)

QUESTION 122.

Speed Limit Enforcement : Rajendra works in traffic police and manage traffic on highway. His van is having radar detection equipment. He takes up a hidden position 50 meter from the highway. Using a sighting device he finds the angle between his position and a road sign in the distance is 60° . He then uses a stop watch to determine how long it takes a vehicle to pass her location and reach the road sign. In quick succession—an 18-wheeler, a truck, and a car pass her position, with the time each takes to travel this distance

noted.



Find the speed of each vehicle in miles per hour if

- (i) the 18-wheeler takes 8 sec,
- (ii) the truck takes 6 sec,
- (iii) the car takes 4 sec.

Sol : [View Answer](#)

QUESTION 123.

CN Tower : The tallest free-standing tower in the world is the CN Tower in Toronto, Canada. The tower includes a rotating restaurant high above the ground.



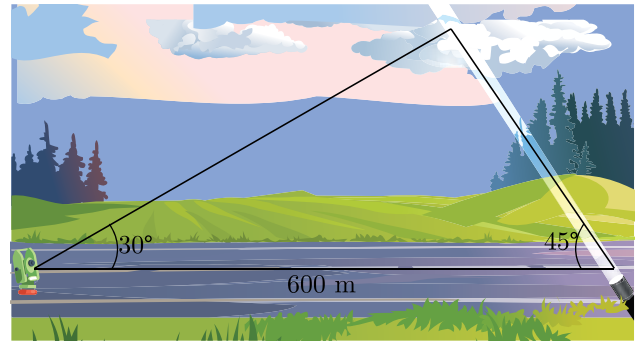
From a distance of 208 meter the angle of elevation to the pinnacle of the tower is 60° . The angle of elevation to the restaurant from the same vantage point is 45° .

- (i) How tall is the CN Tower?
- (ii) How far below the pinnacle of the tower is the restaurant located?

Sol : [View Answer](#)

QUESTION 124.

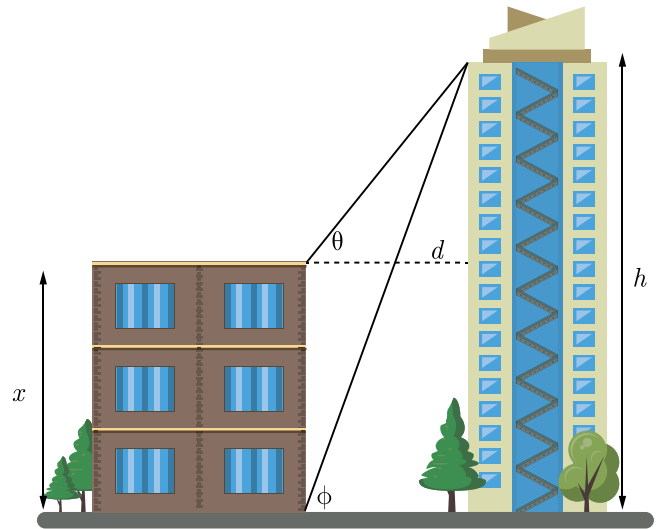
Height of Cloud Cover : To measure the height of the cloud cover at an airport, a worker shines a spotlight upward at an angle 45° from the horizontal. An observer 600 m away measures the angle of elevation to the spot of light to be 30° . Find the height of the cloud cover.



Sol : [View Answer](#)

QUESTION 125.

Use the diagram given to derive a formula for the height h of the taller building in terms of the height x of the shorter building and the ratios for $\tan \theta$ and $\tan \phi$.



Sol : [View Answer](#)

QUESTION 126.

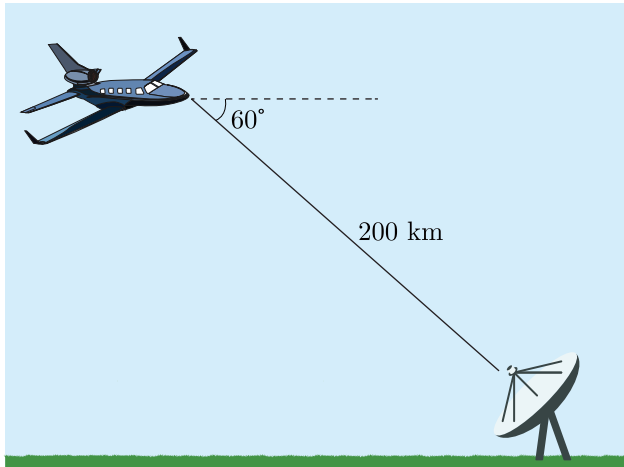
Rainbow: While visiting the Mount Abu in Rajasthan, Taniya and Lavanya see a spectacularly vivid rainbow arching over the lake. Taniya speculates the rainbow is 250 m away, while Lavanya estimates the angle of elevation to the highest point of the rainbow is about 60° . What was the approximate height of the rainbow?



Sol : [View Answer](#)

QUESTION 127.

Distance Measuring Equipment : DME is standard avionic equipment on a commercial airplane. This equipment measures the distance from a plane to a radar station. If the distance from a plane to a radar station is 200 km and the angle of depression is 30° , find the ground distance from a point directly below the plane to the radar station.

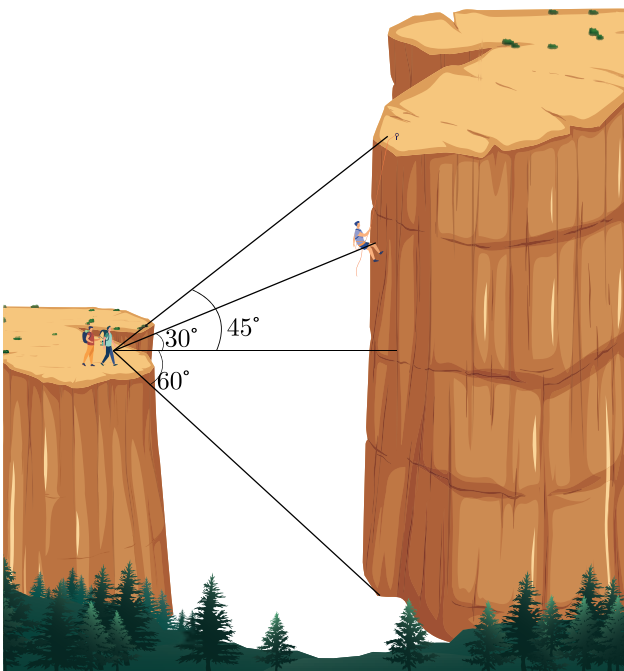


Sol :

[View Answer](#)

QUESTION 128.

Height of a Climber : Himalayan Trekking Club has just hiked to the south rim of a large canyon, when they spot a climber attempting to scale the taller northern face. Knowing the distance between the sheer walls of the northern and southern faces of the canyon is approximately 150 meter, they attempt to compute the distance remaining for the climbers to reach the top of the northern rim.



Using a homemade transit, they sight an angle of depression of 60° to the bottom of the north face, and angles of elevation of 30° and 45° to the climbers and top of the northern rim respectively.

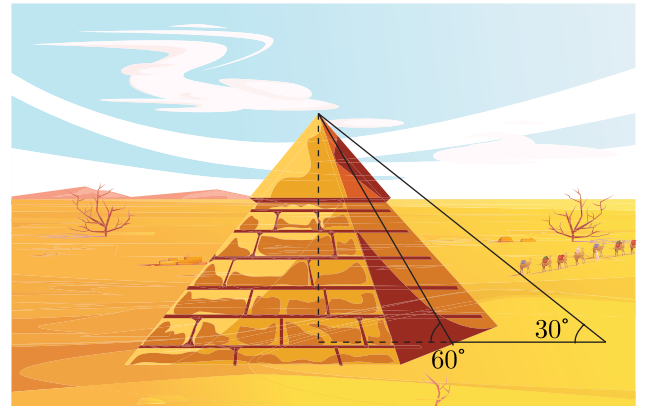
- (i) How high is the southern rim of the canyon?
- (ii) How high is the northern rim?
- (iii) How much farther until the climber reaches the top?

Sol :

[View Answer](#)

QUESTION 129.

Height of a Pyramid : The angle of elevation to the top of the Egyptian pyramid of Cheops is 30° measured from a point 50 meter from the base of the pyramid. The angle of elevation from the base of a face of the pyramid is 60° .



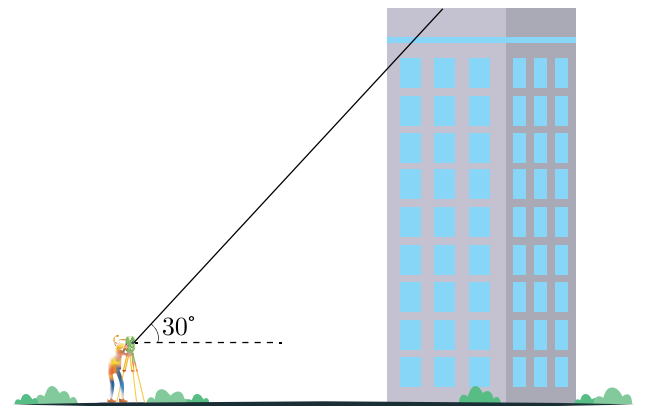
- (i) Find the height of the Cheops pyramid.
- (ii) Find the side of base of pyramid.

Sol :

[View Answer](#)

QUESTION 130.

Height of a Building : A surveyor determines that the angle of elevation from a transit to the top of a building is 30° . The transit is positioned 2 meter above ground level and 30 meter from the building. Find the height of the building.



Sol :

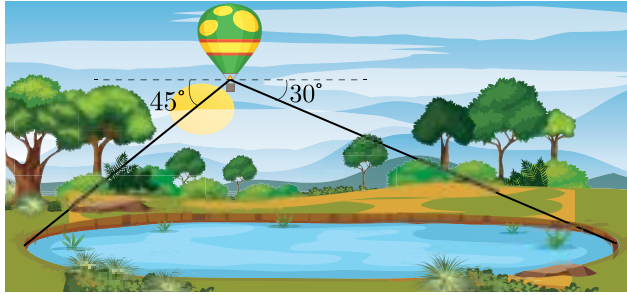
[View Answer](#)

QUESTION 131.

Width of a Lake : The angle of depression to one side of a lake, measured from a balloon 300 meter above the lake as shown in the accompanying figure, is 45° . The angle of depression to the opposite side of the lake is 30° .

- (i) Find the width of the lake.

(ii) Find the ground distance of balloon from sides of lake.



Sol :

[View Answer](#)

QUESTION 132.

Washington Monument : The Washington Monument is a large, tall, white obelisk near the west part of the National Mall in Washington, D.C. It was built to remember George Washington, who was the first President of the United States. It is the tallest stone structure in the world



From a point A on a line from the base of the Washington Monument, the angle of elevation to the top of the monument is 45° . From a point 125 m away from A and on the same line, the angle to the top is 30° . Find the height of the Washington Monument.

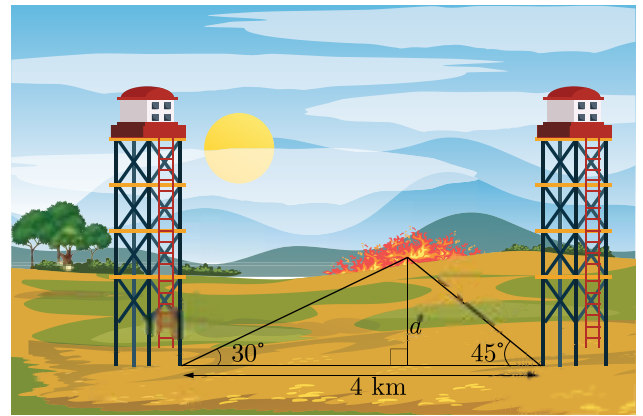
Sol :

[View Answer](#)

QUESTION 133.

Fire towers : Two fire towers are 4 kilometres apart, where tower is due west of tower. A fire is spotted from the towers, and the angle of fire sight from tower is shown below. Find

the distance of the fire from the line segment.

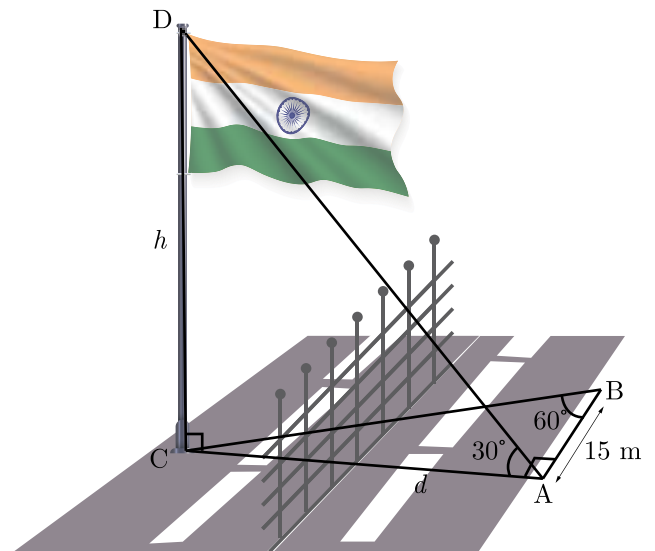


Sol :

[View Answer](#)

QUESTION 134.

Flag Pole : Figure given below is a diagram that shows how Varsha estimates the height of a flagpole. She can't measure the distance between herself and the flagpole directly because there is a fence in the way.



So she stands at point A facing the pole and finds the angle of elevation from point A to the top of the pole to be 30° . Then she turns 90° and walks 15 metre to point B, where she measures the angle between her path and a line from B to the base of the pole. She finds that angle is 60° . Find the height of the pole.

Sol :

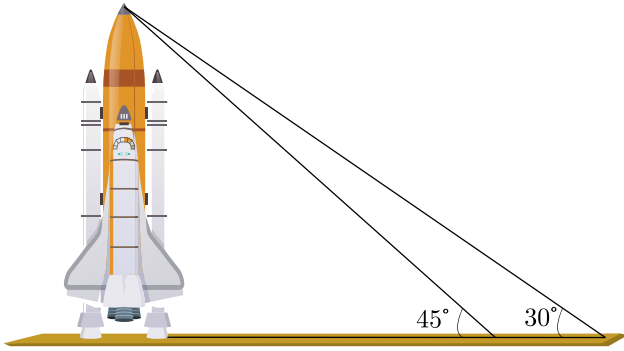
[View Answer](#)

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QUESTION 135.

An observer notes that the angle of elevation from point A to the top of a space shuttle is 45° . From a point 20 meters further from the space shuttle, the angle of elevation is 30° .

- (i) Find the height of the space shuttle.
- (ii) Find the distance of point A from space shuttle.



Sol :

[View Answer](#)

QUESTION 136.

Height of a Door : From a point on the floor the angle of elevation to the top of a door is 30° , while the angle of elevation to the ceiling above the door is 60° . The ceiling is 6 metre above the floor.

- (i) What is the vertical dimension of the door ?
- (ii) Find the distance of the point from door.

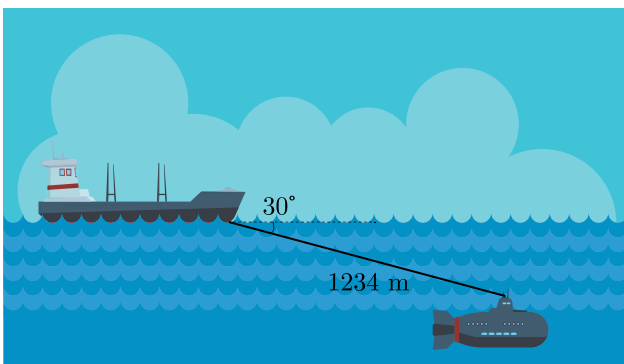


Sol :

[View Answer](#)

QUESTION 137.

Sonar : It is a machine that uses underwater sound waves to find other objects in the sea. A sonar can work by sending out sound and listening for echoes (active sonar), like a radar, or by listening for sound made by the object it is trying to find.



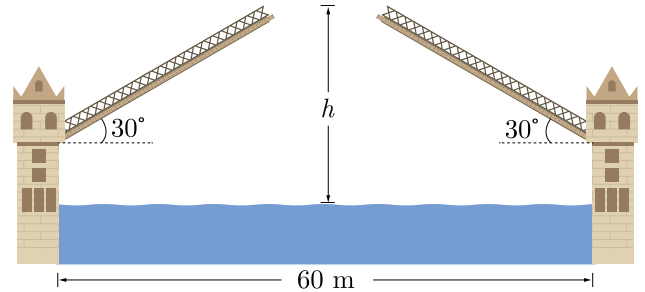
The sonar of a navy cruiser detects a sub marine that is 1234 meter from the cruiser. The angle between the water line and the submarine is 30° . How deep is the submarine?

Sol :

[View Answer](#)

QUESTION 138.

Drawbridge : A drawbridge is a bridge that can be moved in order to stop or allow passage across it. Modern drawbridges are often built across large, busy waterways. They can be lifted to allow large ships to pass or lowered to allow land vehicles or pedestrians to cross.



A drawbridge is 60 metre long when stretched across a river. As shown in the figure, the two sections of the bridge can be rotated upward through an angle of 30° .

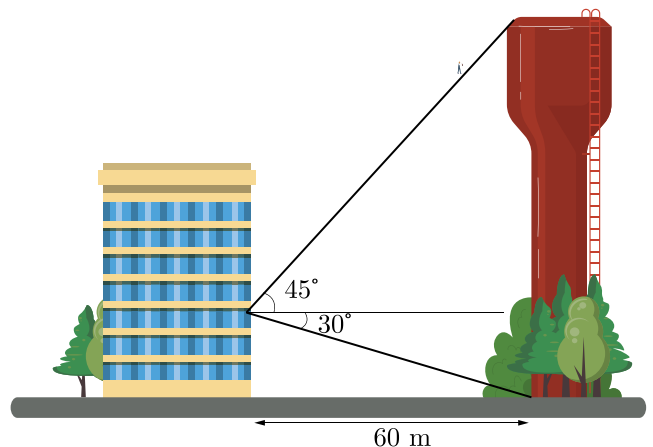
- (i) If the water level is 5 metre below the closed bridge, find the height h between the end of a section and the water level when the bridge is fully open.
- (ii) How far apart are the ends of the two sections when the bridge is fully opened, as shown in the figure?

Sol :

[View Answer](#)

QUESTION 139.

Water Tower : A water tower is a building that is used to hold and give out water. It is almost always built on a high place. It works because a pump gives water to the tower, and gravity makes the saved water go out to the places that need water. Those places are connected to the tower by pipes. A water tower is good when there is no power because it uses gravity to send out the water.



A water tower is located 60 meter from a building (see the figure). From a window in the building, an observer notes that the angle of elevation to the top of the tower is 60° and that the angle of depression to the bottom of the tower is 30° .

- (i) How tall is the tower?
- (ii) How high is the window?

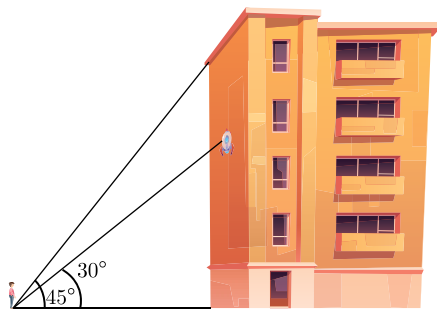
View Answer

QUESTION 140.

Clinometer : A clinometer is a tool that is used to measure the angle of elevation, or angle from the ground, in a right - angled triangle. We can use a clinometer to measure the height of tall things that you can't possibly reach to the top of, flag poles, buildings, trees.



Ravish got a clinometer from school lab and started the measuring elevation angle in surrounding. He saw a building on which society logo is painted on wall of building.



From a point P on the ground level, the angle of elevation of the roof of the building is 45° . The angle of elevation of the centre of logo is 30° from same point. The point P is at a distance of 24 m from the base of the building.

- (i) What is the height of the building logo from ground ?
- (ii) What is the height of the building from ground ?
- (iii) What is the aerial distance of the point P from the top of the building ?
- (iv) If the point of observation P is moved 9 m towards the base of the building, then the angle of elevation θ of the logo on building is given by

- (a) $\tan \theta = \sqrt{3}$
- (b) $\tan \theta = \frac{2}{\sqrt{3}}$
- (c) $\tan \theta = \frac{1}{2}$
- (d) $\tan \theta = \frac{8\sqrt{3}}{15}$

(v) In above case the angle of elevation ϕ of the top of building is given by

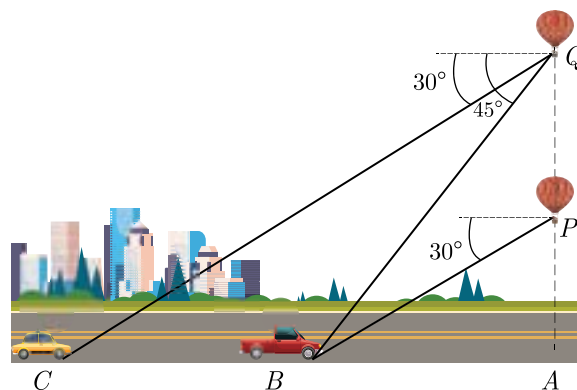
- (a) $\tan \phi = 1.6$
- (b) $\tan \phi = 1.5$
- (c) $\tan \phi = 0.75$
- (d) $\tan \phi = 0.8$

Sol :

View Answer

QUESTION 141.

A hot air balloon is a type of aircraft. It is lifted by heating the air inside the balloon, usually with fire. Hot air weighs less than the same volume of cold air (it is less dense), which means that hot air will rise up or float when there is cold air around it, just like a bubble of air in a pot of water. The greater the difference between the hot and the cold, the greater the difference in density, and the stronger the balloon will pull up.



Lakshman is riding on a hot air balloon. After reaching at height x at point P , he spots a lorry parked at B on the ground at an angle of depression of 30° . The balloon rises further by 50 metres at point Q and now he spots the same lorry at an angle of depression of 45° and a car parked at C at an angle of depression of 30° .

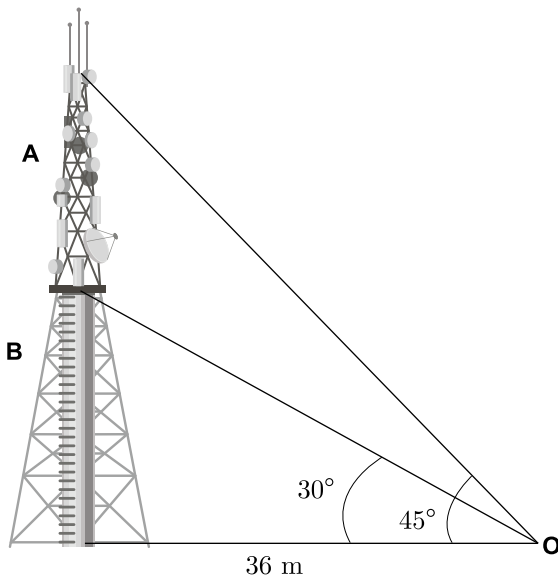
- (i) What is the relation between the height x of the balloon at point P and distance d between point A and B ?
- (ii) When balloon rises further 50 metres, then what is the relation between new height y and d ?
- (iii) What is the new height of the balloon at point Q ?
- (iv) What is the distance AB on the ground ?
- (v) What is the distance AC on the ground ?

View Answer

QUESTION 142.

Radio towers are used for transmitting a range of communication services including radio and television. The tower will either act as an antenna itself or support one or more antennas on its structure, including microwave dishes. They are among the tallest human-made structures. There are 2 main types: guyed and self-supporting structures.

On a similar concept, a radio station tower was built in two sections A and B . Tower is supported by wires from a point O . Distance between the base of the tower and point O is 36 m. From point O , the angle of elevation of the top of section B is 30° and the angle of elevation of the top of section A is 45° .

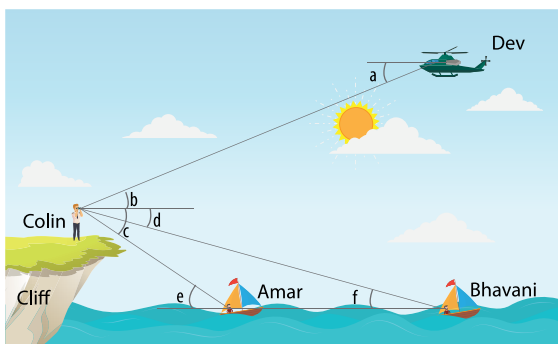


- (i) What is the height of the section B ?
- (ii) What is the height of the section A ?
- (iii) What is the length of the wire structure from the point O to the top of section A ?
- (iv) What is the length of the wire structure from the point O to the top of section B ?
- (v) What is the angle of depression from top of tower to point O ?

Sol : [View Answer](#)

QUESTION 143.

Navy Officer : Mr. Colin is tasked with planning a coup on the enemy at a certain date. Currently he is inspecting the area standing on top of the cliff. Agent Dev is on a chopper in the sky. When Mr. Colin looks down below the cliff towards the sea, he has Bhawani and Amar in boats positioned to get a good vantage point. Bhawani boat is behind the Amar boat.



Following angle have been measured :

From Colin to Bhawani : 30°

From Dev to Colin : 60°

From Amar to Colin : 60°

(i) Which of the following is a pair of angle of elevation?

- (a) $(\angle a, \angle e)$
- (b) $(\angle b, \angle e)$
- (c) $(\angle c, \angle d)$
- (d) $(\angle a, \angle f)$

(ii) Which of the following is a pair of angle of depression?

- (a) $(\angle a, \angle e)$
- (b) $(\angle b, \angle e)$
- (c) $(\angle c, \angle d)$
- (d) $(\angle a, \angle f)$

(iii) If angle of elevation of Amar to Colin is 60° , what is the distance of Amar boat from the base of hill ?

(iv) If angle of depression of Colin to Bhawani is 30° , what is the distance of Amar boat from the Bhawani boat?

(v) If angle of depression of Dev to Colin is 60° , what is the height of Dev from base of hill ?

Sol : [View Answer](#)

QUESTION 144.

When an eagle looks at a rat on the ground, eagle does not attack the rat at its initial position. It takes into account the speed of the rat and the direction in which rat is moving. After analysing the situation (how? it may be God's gift) eagle attacks the rat in such a way that it may successful in catching the rat.



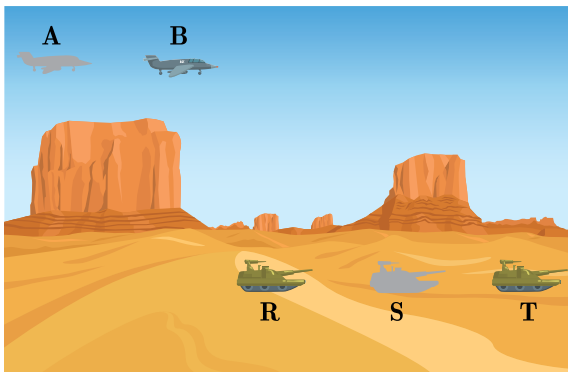
Suppose an eagle sitting on the tree of height 90 m, observe a rat with angle of depression 45° , and moving away from the tree with some speed. Eagle start flying with 30° downward and catch rat in 10 second.

- (i) What is the horizontal distance between tree and initial position of rat ?
- (ii) What is the distance travelled by rat in 10 seconds?
- (iii) What is the distance travelled by eagle to catch rat?
- (iv) What is the speed of rat ?
- (v) What is the speed of eagle ?

Sol : [View Answer](#)

QUESTION 145.

An air-to-surface missile (ASM) or air-to-ground missile (AGM or ATGM) is a missile designed to be launched from military aircraft and strike ground targets on land, at sea, or both. They are similar to guided glide bombs but to be deemed a missile,



A military fighter plane is flying at an altitude of 600 metres with the speed of 200 km/h. The pilot spots enemy tanks at point R on ground. After getting the permission from command centre to hit the target at R , pilot fires a missile. Fighter plane was at point A at the time of fire of missile. Missile moves to target at enemy tanks stationed at R at an angle of 45° at a speed of 300 km/h.

- (i) What is the horizontal distance between fighter plane at A and tank at R ?
- (ii) How much time will missile take to hit the target R ?
- (iii) Another enemy tank at point S on ground moving with a speed of 90 km/h in straight line away from plane. Pilot fires another missile at an angle of 60° from its flight path position B at the instant when enemy's tank was at S and it hits this enemy tank at point T . How much time is taken by second missile to hit the enemy tank at point T ?
- (iv) What is the horizontal distance between fighter plane at B and tank at T ?
- (v) What is the distance of point T from S ?

Sol :

View Answer

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