Ravi Maths Tuition

Some Applications of Trigonometry

10th Standard

Maths

Multiple Choice Question 68 x 1 = 68

1) Which of the following is rational?

(a) $\sqrt{3} + \sqrt{5}$ (b) $\sqrt{4} + \sqrt{9}$ (c) $\sqrt{2} + \sqrt{4}$ (d) $\sqrt{6} + \sqrt{9}$

2) A kite is flying, attached to a thread which is 165m long. The thread makes an angle of 300 with the ground. The height of the kite from the ground, assuming that there is no slack in the thread is

(a) 84 m (b) 82.5 m (c) 81.5 m (d) 80 m

3) A tree casts a shadow 4 m long on the ground, when the angle of elevation of the sun is 450. The height of the tree is:

(a) 4.5 m (b) 3 m (c) 5.2 m (d) 4 m

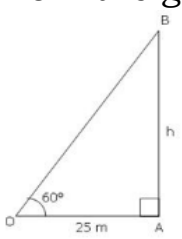
4) A man is standing on the deck of a ship, which is 8 m above water level. He observes the angle of elevation of the top of a hill as 600 and angle of depression of the base of the hill as 300. What is the height of the hill?

(a) 32 m (b) $24\sqrt{3}$ m (c) 24m (d) $8\sqrt{3}$ m

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

(a) 60° (b) 45° (c) 30° (d) 15°

6) From the given figure, find h

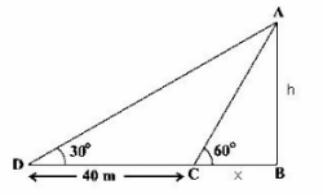


(a) $\sqrt{3}$ m (b) $25\sqrt{3}$m (c) $50\sqrt{3}$ m (d) $2\sqrt{3}$ m

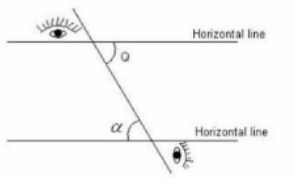
7) A tower stands vertically on the ground. From a point C on the ground, which is 20 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 45°. The height of the tower is

(a) 10 m (b) 8 m (c) 15 m (d) 20 m

8) Find AB in the given figure



(a) $\sqrt{3}$ (b) $30\sqrt{3}$ (c) $20\sqrt{3}$ (d) $10\sqrt{3}$

9) 

In the above fig Q and α respectively are

(a) Angle of Depression and Angle of Depression (b) Angle of Elevation and Angle of depression

(c) Angle of Elevation and Angle of Elevation (d) Angle of depression and Angle of Elevation

10) Two pillars are a metres apart and the height of one is double that of the other. If from the middle point of the line joining their feet, an observer finds the angular elevation of their tops to be complementary, then the height of the taller pillar is

(a) $a\sqrt{2^m}$ (b) 2a m (c) a m (d) $a/\sqrt{2}$ m

11) An electrician has to repair an electric fault on a pole of height 4 m. He needs to reach a point 1.3 m below the top of the pole to undertake the repair work. The length of the ladder he should use which when inclined at an angle of 60° to the horizontal would enable him to reach the required position is:

(a) $\frac{9\sqrt{3}}{5}$ m (b) $\frac{5}{9}$ m (c) $\frac{\sqrt{3}}{5}$ m (d) $\frac{9}{5}$ m

12) A man has a height of 1.732 m. He observes the angle of depression to the head and toe of his son as 30° and 60° respectively. What is the height of his son? (Take $\sqrt{3} = 1.732$)

(a) 3 m (b) 1.155 m (c) 3.464 m (d) 1.732 m

13) If the angle of elevation of a cloud from a point 100 metres above a lake is 30° and the angle of depression of its reflection in the lake is 60°, then the height of the cloud above the lake is

(a) 200 m (b) 30 m (c) 500 m (d) 100 m

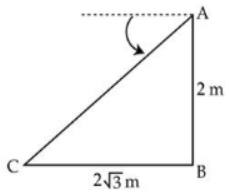
14) A tower stands vertically on the ground. From a point on the ground 30 m away from the foot of the tower, the angle of elevation of the top of the tower is 45°. The height of the tower will be

(a) $30\sqrt{3}$ m (b) 30 m (c) 40 m (d) $40\sqrt{3}$ m

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

(a) 45° (b) 60° (c) 90° (d) 30°

16) The figure shows the observation of point C from point A. The angle of depression from A is:



(a) 30° (b) 60° (c) 75° (d) 45°

17) If the angles of depression from the top of a tower of height 40 m to the top and bottom of a tree are 45° and 60° respectively, then the height of the tree is

(a) $\frac{40}{3}(3-\sqrt{3})$ (b) $\frac{20}{3}(\sqrt{3}+3)$ (c) $\frac{20}{3}(\sqrt{3}+1)$ (d) $\frac{40}{3}(\sqrt{3}-1)$

18) An observer 1.5 m tall is 28.5 m away from a tower. The angle of elevation of the top of the tower from his eyes is 45°. The height of the tower is

(a) 30 m (b) 20 m (c) 40 m (d) 10 m

19) The angle formed by the line of sight with the horizontal, when the point being viewed is above the horizontal level is called:

(a) Obtuse angle (b) Angle of elevation (c) Angle of depression (d) Vertical angle

20) If altitude of the sun is 60°, the height of a tower which casts a shadow of length 30 m is:

(a) $30\sqrt{3}$ cm (b) $30/\sqrt{3}$ m (c) 15 m (d) $15\sqrt{2}$ m

21) The angles of elevation of the top of a cliff from two points x and y metres from the base and in the same straight line with it are complementary. The height of the cliff is

(a) $x\sqrt{ym}m$ (b) $\sqrt{x}y \quad m$ (c) $\sqrt{XY}m$ (d) xy m

22) The length of shadow of a tower on the plane ground is $\sqrt{3}$ times the height of the tower. The angle of elevation of sun is :

(a) 90^o (b) 60^o (c) 30^o (d) 45^o

23) A vertical tower is 20 m high. A man at some distance from the tower knows that the cosine of the angle of the elevation of the top of tower is 0.5. He is standing from the foot of the tower at a distance of:

(a) $30\sqrt{3}$ m (b) $20\sqrt{3}$ m (c) $20/\sqrt{3}$ m (d) $10/\sqrt{3}$ m

24) The horizontal distance between two towers is 140 m. The angle of elevation of the top of the first tower when seen from the top of the second tower is 30°. If the height of the second tower is 60 m then, the height of the first tower is

(a) 139.5 m (b) 142 m (c) 135 m (d) 140.83 m

25) Consider a constellation of 3 stars A, B and C forming a right triangle with angle ABC = 90° and angle BAC = 30° . If the distance between star A and B is $3\sqrt{3}$ x 1013 km, then how much time does light take to travel from star C to B with a speed of 3 x 108 m/s?

(a) $\sqrt{3} \times 10^5$ sec (b) 10^4 sec (c) $\sqrt{3} \times 10^4$ sec (d) 10^5 sec

26) A tree is broken by the wind. The top struck the ground at an angle of 30° and at a distance of 30 metres from the foot of the tree. The height of the tree in metres is

(a) $35\sqrt{3}$ (b) $40\sqrt{3}$ (c) $25\sqrt{3}$ (d) $30\sqrt{3}$

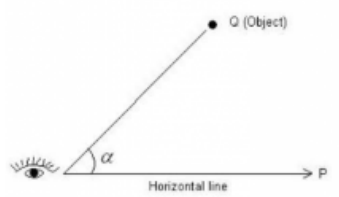
27) A tower stands vertically on the ground from a point on the ground which is 25 m away from the foot of tower if the height of tower is $25\sqrt{3}$ metres find the angle of elevation.

(a) 120° (b) 90° (c) 60° (d) 30°

28) A tower stands vertically on the ground from a point on the ground which is 15 m away from the foot of tower. If the height of tower is $15\sqrt{3}$ meters find the angle of elevation

(a) 30° (b) 60° (c) 90° (d) 120°

29) In the following figure α is



(a) Angle of Depression (b) Angle of incidence (c) Angle of Elevation (d) Angle of sight

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

(a) 20 (b) $40\sqrt{3}$ (c) $20\sqrt{3}$ (d) 40

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

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

32) A 20 m long ladder touches the wall at a height of 10 m. The angle which the ladder makes with the horizontal is

(a) 30° (b) 45° (c) 60° (d) 90°

33) Consider a ladder which makes an angle of 60° with a wall of height 10 m and its top just touches the top of the wall. If the ladder is now rotated in such a way that its top now touches the top of the opposite wall which has a height of $10/\sqrt{3}$ m. What is the angle by which the ladder is rotated.

(a) 45° (b) 60° (c) 90° (d) 30°

34) A tree is broken by wind and its upper part touches the ground at a point 10 metres from the foot of the tree and makes an angle of 45° with the ground. The entire length of the tree is

(a) 20 m (b) $10 (1 + \sqrt{2})$ m (c) $10\sqrt{2}$ m (d) 10 m

35) A man has to clean a window at a height of 5 m on a building. He needs to reach a point 1.3m below the window to clean it. What should be the length of the ladder that he should use which, when inclined at an angle of 60° to the horizontal, would enable him to reach the required position?

(a) 2.46 (b) $2\sqrt{3}$ (c) $2.46/\sqrt{3}$ (d) $2.46\sqrt{3}$

36) The angle of elevation from a point 30 feet from the base of a pole, of height h, as level ground to the top of the pole is 45° degree. Which equation can be used to find the height of the pole.

(a) $\tan 45° = 30/h$ (b) $\tan 45° = h/30$ (c) $\sin 45° = h/30$ (d) $\cos 45° = h/30$

37) A man on a top of a tower observes a truck at an angle of depression α where $\tan\alpha = 1/\sqrt{5}$ and sees that it is moving towards the base of the tower. Ten minutes later, the angle of depression of the truck is found to be β where $\tan\beta = \sqrt{5}$. If the truck is moving at a uniform speed, then how much more time it will take to reach the base of the tower.

(a) $150\sqrt{5}$ sec (b) 1500 sec (c) 150 sec (d) $150/\sqrt{5}$ sec

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

(a) Line of sight (b) Line of sight propagation (c) Line of symmetry (d) Line of incidence

39) A kite is flying at a height of 75 metres from the ground level, attached to a string inclined at 60° to the horizontal. The length of the string to the nearest metre is

(a) 55 m (b) 87 m (c) 100 m (d) 60 m

40) Consider a ship with a right triangular mast. If the base of the mast is 10 m long, and the angle that the mast makes with the base is 60°, then what area of cloth is used to make the mast?

(a) $50(\sqrt{3}+1)\ m^2$ (b) $50\sqrt{3}\ m^2$ (c) $50\ m^2$ (d) $100\ m^2$

41) A ladder leaning against a wall makes an angle of 60° with the wall. If its foot is 6.2 m away from the wall, its length is

(a) 10.2 m (b) 8 m (c) 14.2 m (d) 12.4 m

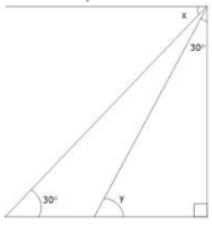
42) The angle of depression from the top of a tower 12 m high, at a point on the ground is 30°. The distance of the point from the top of the tower is:

(a) $12\sqrt{3}$ m (b) 24 m (c) 6 m (d) 12 m

43) Consider a ship with a right triangular mast. If the base of the mast is 10 m long, and the angle that the mast makes with the base is 60°, then what area of cloth is used to make the mast?

(a) $50(\sqrt{3}+1)\ m^2$ (b) $50\sqrt{3}\ m^2$ (c) $50\ m^2$ (d) $100\ m^2$

44) In the given figure, the respective values of y and x are



(a) 60° and 30° (b) 45° and 60° (c) 60° and 45° (d) 30° and 45°

45) If the angle of the top of the 200 m high tower from a point C on the ground is 30°. The distance of the point C from the foot of the tower is (Take $\sqrt{3} = 1.732$)

(a) 346.4 m (b) 173.6 m (c) 300.4 m (d) 246.6 m

46) If sun's elevation is 60° then a pole of height 6 m will cast a shadow of length

(a) $3\sqrt{2}$ m (b) $2\sqrt{3}$ m (c) $6\sqrt{3}$ m (d) $\sqrt{3}$ m

47) 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

48) 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

49) 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

50) 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 the observer is

(a) 30° (b) 45° (c) 60° (d) 90°

51) A tree 6 m tall cast a 4m 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

52) 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

53) A kite is flying at a height of 80 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 ground is 60°, then the length of the string is

(a) 62.37 m (b) 92.37 m (c) 52.57 m (d) 72.57 m

54) A ladder, leaning against a wall, makes an angle of 60° with the horizontal. If the foot of the ladder is 9.5 m away from the wall. The length of the ladder is

(a) 10 m (b) 16 m (c) 18 m (d) 19 m

55) 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) $\sqrt{\frac{b}{a}}$

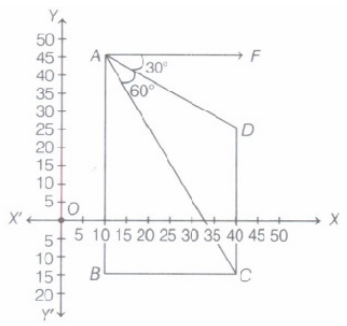
56) From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high. building are 45° and 60° respectively, then the height of the tower is

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

57) A tower stands at the centre of a circular park. If A and B are two points on the boundary of the park, such that AB = a m subtends an angle of 60° at the foot of the tower and the angle of elevation of the top of the tower from A or B is 30°. Find, then the height of the tower is

(a) $\sqrt{3}$ a m (b) $a/\sqrt{3}m$ (c) $\frac{\sqrt{3}}{a}m$ (d) None of these

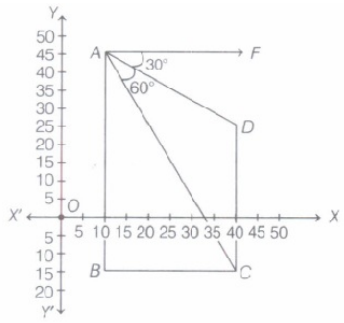
58) In the following figure, from the top of a building AB, 60 m high, the angles of depression of the top and the bottom of a vertical lamp post CD are observed to be 30° and 60°, respectively.



Find the horizontal distance between BA and CO.

(a) $60\sqrt{3}$ m (b) $40\sqrt{3}$ m (c) $20\sqrt{3}$ m (d) $10\sqrt{3}$ m

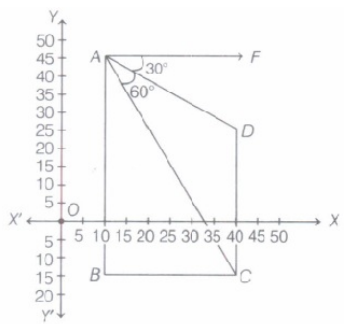
59) In the following figure, from the top of a building AB, 60 m high, the angles of depression of the top and the bottom of a vertical lamp post CD are observed to be 30° and 60°, respectively.



Find the height of the lamp post CD.

(a) 60 m (b) 40 m (c) 20 m (d) 10 m

60) In the following figure, from the top of a building AB, 60 m high, the angles of depression of the top and the bottom of a vertical lamp post CD are observed to be 30° and 60°, respectively.



Find the radius of the circle, if Y-axis and AB are the tangents to the circle.

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

61) First, plot the points A(2, 4), B (6, 4), C (6,2) and 0 (2,2) and join all adjacent points. A pole BE of height his standing on point B. If Angle of elevation of the top of a pole from point A is 30°, The total area formed by the
figure is

(a) $8(\sqrt{3}+1)m^2$ (b) $8(\sqrt{3}-1)m^2$ (c) $\frac{8(\sqrt{3}+1)}{\sqrt{3}}\ m^2$ (d) $\frac{8(\sqrt{3}-1)}{\sqrt{3}}m^2$

62) If the angle of elevation of a cloud from a point h m above a lake is a and angle of depression of its reflection in the take is β. Then the height of the cloud is

(a) $\frac{h(\tan\beta+\tan\alpha)}{\tan\beta-\tan\alpha}$m (b) $\frac{h(\tan\beta-\tan\alpha)}{\tan\beta+\tan\alpha}$m (c) $\frac{h\tan\beta+\tan\alpha}{\tan\beta-\tan\alpha}$ (d) $\frac{h\tan\beta-\tan\alpha}{\tan\beta+\tan\alpha}$

63) A ladder rests against a vertical wall at an inclination a to the horizontal. If its foot is pulled away from the wall through a distance p, so that its upper end slides at distance down the wall and then the ladder makes an angle β to the horizontal, then $\frac{\cos\beta-\cos\alpha}{\sin\alpha-\sin\beta}$ is equal to

(a) p / a (b) p / q (c) qp (d) 1 / pq

64) A spherical balloon of radius r subtends an angle eat the eye of the observer. If the angle of elevation of its centre is Φ, then the height of the centre of balloon is

(a) r sin Φ/2 cos θ (b) r sin Φ cosec θ (c) r sin Φ cosec θ/2 (d) None of these

65) From a point on the ground which is 30 m away from the foot of a vertical tower, the angle of elevation of the top of the tower is found to be 60°. The height (in metres) of the tower is

(a) $10\sqrt{3}$ (b) $30\sqrt{3}$ (c) 60 (d) 30

66) If the height of the tower is equal to the length of its shadow, then the angle of elevation of the Sun is

(a) 30° (b) 45° (c) 60° (d) 90°

67) A circus artist is climbing a 30 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

68) Seaweed is found under 80 m deep seafloor. To reach it, a diver makes a 45° dive from a boat. What is the distance travelled by the diver to reach the seafloor?

(a) 80 m (b) 80.2 m (c) 80√2 m (d) 80√3 m

Fill up / 1 Marks 22 x 1 = 22

69) The length of the shadow of a tree 8m high, when the sun's elevation is 45^0 , is .....

70) If the height of a tower and the distance of the point of observation from its foot, both are increased by 10% then the angle of elevation of its top remains.....

71) The height of a tower is 10m.The height of its shadow when sun's altitude is 45^0 , is .....

72) A 6m tall tree casts a shadow of length 4m.If at the same time a flagpole casts a shadow 50m in length, then the length of the flagpole is.....

73) If the ratio of the length of a pole and its shadow is 1 : 1, then angle of elevation of the sun is..... .

74) The angle of ..... of an object viewed, is the angle formed by the line of sight with the horizontal when it is above the horizontal level.

75) The angle of ..... of an object viewed, is the angle formed by the line of sight with horizontal when it is below the horizontal level.

76) If the angle of elevation of the top of a tower from two points distance and t from its foot are complementary, the height of the tower is .....

77) If the ratio of the length of a pole and its shadow is $\sqrt{3} : 1$, then the sun's elevation is .....

78) If the length of the shadow of a tower is increasing, then the angle of elevation of the sun is .....

79) A tower stands vertically on the ground.From a point on the ground, which is 100m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60^0, then the height of the tower is .....

80) The length of the shadow of a tree 10 high, when the sun's elevation is 30^0 , is .....

81) If sun's elevation is 45^0, then ratio of the length of a pole and its shadow is .....

82) If the ratio of the length of a pole and its shadow is $1 : \sqrt{3}$, then sun's elevation is .....

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

84) If height of a tower and distance of the point of observation from its foot, both are increased by 50%, then angle of elevation of its top.....

85) A 6m long pole casts a shadow of 4m long.At the same time a tree casts a shadow of 28m long, then length of tree is.....

86) If the horizontal distance between the two trees 20m and 28m high is 15m, then distance between their tops is.....

87) The angle of elevation of the Sun, when the length of a shadow of a vertical pole is double to its height, is .....

88) The angle of elevation of the top of a tower from a distance of 100m from its foot is 30°. The height of tower is .....

89) The angle of elevation of a ladder leaning against a wall is 60° and the foot of the ladder is 19 m away from the wall. The length of the ladder is.....

90) A circle artist is climbing a 10m 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 60°, is.....

True or False 27 x 1 = 27

91) The line of sight is the line from the eye of an observer to the point in the viewed by the observer.

(a) False (b) True

92) The height of an object or distance between two distinct objects can be determined with help of trigonometric ratios.

(a) False (b) True

93) Trigonometric ratios are same for the same angles.

(a) False (b) True

94) The angle of elevation of the top of a tower is 60^0.If the height of the tower is doubled, then the angle of elevation of its top will also doubled.

(a) True (b) False

95) If the ratio of the height of a tower and the length of its shadow $\sqrt{3}:1$, then the elevation of the sun is 30^0

(a) True (b) False

96) If height of a tower and the distance of the point of observation from its foot, both are increased by 20%, then angle of elevation of its remains unchanged

(a) False (b) True

97) If a man standing on a platform 5m above the surface of a lake observes a cloud and its reflection in the lake, then the angle of elevation of the cloud is equal to the angle of depression of its reflection.

(a) True (b) False

98) The length of the shadow of a tree 12m high, when sun's elevation is 45^0, is $12\sqrt{3}$ m

(a) True (b) False

99) A tree is broken by the wind, the top struck the ground at an angles of 60^0 and at a distance of 30m from the root of the tree.Then whole height of the tree is $30(2+\sqrt{3})m$.

(a) False (b) True

100) A circus artist is climbing a 20m 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 30^0, then the height of the pole is 15m

(a) True (b) False

101) Two posts are 120m apart and the height of one is double that of the other.If from the middle point of the line joining their feet, an observer finds that the angular elevations of their tops to be complementary, then the height of the poles are $30\sqrt{2}m$ and $60\sqrt{2}m$

(a) False (b) True

102) The angle of elevation of the top of a hill at the foot of a tower is 60^0 and the angle of elevation of the top of the tower from the foot the hill is 45^0.If the tower is 100m high, then the height of the hill is 200m.

(a) True (b) False

103) A pole 6m high casts a shadow $2\sqrt{3}$ m long on the ground, then sun's elevation is 30^0

(a) True (b) False

104) Theodolite is an instrument used for measuring the angles of elevation and depression with a rotating telescope.

(a) False (b) True

105) If the length of the shadow of a tower is increasing, then the angle of elevation of the sun is also increasing.

(a) True (b) False

106) When the sun's altitude is 45^0, then height of a tower is equal the length of its shadow

(a) False (b) True

107) If two poles of height h_1 and h_2 subtend angles of 60^0 and 30^0 respectively at the mid-point of the line joining their feet, then $h_1:h_2=3:1$.

(a) False (b) True

108) A young boy is flying a kite.the string of the kite makes an angle of 30^0 with the ground.If the length of the string used by the boy is 42m, then the height of the kite is 21m.

(a) True (b) False

109) Angle of elevation of the top from a point on te ground is 45° then, height of the pole is equal to its distance of the foot from the observer.

(a) False (b) True

110) From the figure, height h is 173.2m

(a) True (b) False

111) The length of shadow of a tree 7 m high, when Sun's elevation is 45° is 7 m.

(a) False (b) True

112) A bridge across a river makes an angle of 45° with the river bank. If the length of the bridge across the river is 150m, then width of river is 100m.

(a) True (b) False

113) The angle formed by the line of sight with horizontal, when the being viewed is above the horizontal level, is called angle of elevation.

(a) False (b) True

114) The length of the shadow of a tree 20 m long is $10\sqrt{3}$ m, when the Sun's angle of elevation is 30°.

(a) True (b) False

115) The length of the shadow on the ground of a tower of height 20 m, when the angle of elevation e of the Sun is such that $\tan\theta = \frac{5}{8}$ is 40 m.

(a) True (b) False

116) The height of a pole is 56 m, if it shadow 56 m long on the level of ground, when the angle of elevation of the Sun is 45°.

(a) True (b) False

117) A kite is flying at a height of 10m from the ground. The length of string from the kite to the ground is 20 m. Assuming that there is no slack in the string, then the angle of elevation of the kite at the ground is 30°.

(a) True (b) False

2 Marks 189 x 2 = 378

118) The angle of elevation of the top of a building from the foot of a tower is 30^o and the angle of elevation of the top of the tower from the foot of the building is 60^o. If the tower is 50 m high, find the height of the building.

119) The angle of elevation of the top of a tower from a point 20 meters away from the base is 45^o . Find the height of the tower.

120) If two towers of height h_1 and h_2 subtends angles of 60^o and 30^o respectively at the mid points of line joining their feet, find $h_1 : h_2$

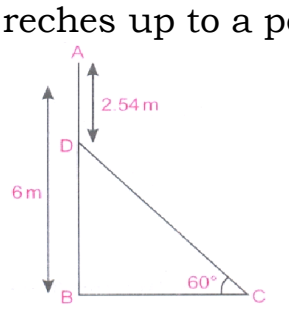
121) Find the angle of elevation of the top of 15 m high tower at a point 15 m away from the base of the tower.

122) If the elevation of the sun at a given time is 30^o , then find the length of the shadow cast by a tower of 150 feet height at that time.

123) At some time of the day the length of the shadow of a tower is equal to its height. Find the sun's altitude at that time.

124) A kite is flying at a height of 30 m from the ground. The length of the string from kite to the ground is 60 m. Assuming that there is no slack in the string, find the angle of elevation of the kite at the ground.

125) 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. $(use\sqrt{3} = 1.73)$



126) 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.

127) 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.

128) When the length of the shadow of a pole of height 7 m is equal to 7 m then find the elevation of these source of light.

129) Find the angle of the elevation of the sun if the length of the shadow of the tower of height 20 m is $20\sqrt{3}$.

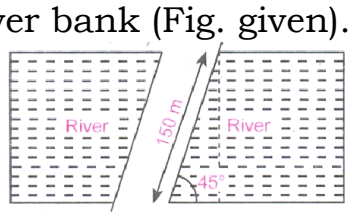
130) If a pole 6 m high throws shadow of $2\sqrt{3}$ m, then find the angle of elevation of the sun.

131) An aeroplane when flying at a height of 3125 m from the ground passes vertically below another plane at an instant when the angles of elevation of the two planes from the same point on the ground are 30° and 60° respectively. Find the distance between the two planes at that instant.

132) 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. $(Use\sqrt{3} = 1.732)$

133) 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.

134) A bridge across a river makes an angle of 45° with the river bank (Fig. given). If the length of the bridge across the river is 150 m, what is the width of the river?



135) 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.

136) 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.

137) 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.

138) 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.

139) A tower stands vertically on the ground. From a point on the ground which is 25m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 45° . Then, find the height (in metres) of the tower.

140) A bridge across a river makes as angle of 45° with the river bank. If the length of the bridge across the river is 150m, then find the width of the river.

141) A tree is broken by the wind. The top struck the ground at an angle of 45° and it a distance 35m from the foot. Then the whole height of the tree before broken.

142) An adult and a young boy, standing on the ground are one metre apart. The height of the adult is 2 times the height of young boy. If at the mid-point of the line joining their feet, the angular elevation of their tops are complementary, then find the height of the young boy.

143) The height of the lighthouse is h m. The angles of depression of two ships on opposite sides of this lighthouse are observed to be 30° *and* 45° . Then, find the distance between the two ships.

144) A tower stands vertically on the ground. From a point on the ground 100 m away from the foot of the tower, the angle of elevation of the top of the tower is 45^o . Find the height of the tower.

145) A vertical tower of height 90 m stands on the ground. The angle of elevation of the top of the tower as observed from a point on the ground is 60^o. Find the distance of the point from the foot of the tower.

146) The height of a tower is 30 m. Calculate the length of its shadow made on the level ground when the sun's altitude is 60^o .

147) A straight highway leads to the foot of a 100 m tall tower. From the top of the tower, angle of depression of a car on the highway is 30^o . Find the distance of the car from foot of the tower.

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

149) A pole casts a shadow of length $20\sqrt{3}$ m on the ground, when the sun's elevation is 60^o . Find the height of the pole.

150) 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^o and 45^o respectively. Find the distance between the cars.$[Use\sqrt{3} = 1.732]$

151) 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.

152) If a pole of height 12 m throws shadow of $4\sqrt{3}$ m. then find the angle of elevation of sun.

153) From the top of a tower 100 m high, the angle of depression of the top and bottom of a pole are observed to be 45^o and 60^o . Find the height of the pole.

154) As observed from the top of light house. 50 m above sea level the angle of depression of ship, sailing directly towards it, changes from 30^o to 45^o . Determine the distance travelled by ship.

155) A portion of 60 m long tree is broken by tornado and the top struck up the ground making an angle of 30^o with the ground level. Find the height of the point where the tree is broken.

156) If the elevation of the sun is 30^o . Find the length of the shadow cast by a tower of height 150 feet.

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

158) Name the line drawn from the eve of an observer to the point in the object viewed by the observer.

159) The angle of depressions of two ships from the top of a light house and on the same side of it are found to be 45^o and 30^o . If the ships are 200 m apart, then find the height of the light house.

160) 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.

161) A 1.2 m tall boy stands at a distance of 2.4 m from a lamppost and casts a shadow of 3.6 m on the ground. Find the height of the lamppost.

162) The height of tower is half the height of the flagstaff on it and the angle of elevation of the top of the tower as seen from the point on the ground is 30^o , find the angle of elevation of the top of the flagstaff as seen from the same point.

163) A tree 6 m tall casts a 4 m long shadow, At the same time, a pole casts a shadow 10 m along. Find the height of the pole.

164) Find the length of the shadow of a 20 m tall pole, on the ground when the sun's elevation is 45^o .

165) Find the length of the string of a kite flying at 100 m above the ground with the elevation of 60^o .

166) If the angle of depression of an object from a 75 m high tower is 30^o, then find the distance of the object from the base of the tower.

167) If the ratio of height of a tower and the length of its shadow on the ground is $\sqrt{3} : 1$, then find the angle of elevation of the sun.

168) If the altitude of the sun is 60^o, find the height of a tower which casts a shadow of length 30 m.

169) The tops of two poles of height 16 m and 10 m are connected by a wire. If the wire makes and angle of 30^o with the horizontal, then find the length of the wire.

170) The angle of elevation of the top of tower from a point on the ground is 45^o . If the observer is 42 m away from the foot of the tower, then find the height of the tower.

171) Find the angle of elevation of the sun, when the length of the shadow of a pole is equal to its height.

172) If the angle of elevation of top of a tower from a point at a distance of 100 m from its foot is 60^o . then find the height of the tower.

173) A tree casts a shadow 4 m long on the ground, when the angle of elevation of the sun is 45^o . Find the height of the tree (in metres).

174) If two tangents inclined at an angle of 60^o are drawn to a circle of radius 3 cm, then find the length of the tangent.

175) If altitude of the sun 60^o, find the height of a tower which casts a shadow of length 30 m.

176) Find the length of the shadow of a tree 7 m high, when the sun's elevation is 45^o .

177) A kite is flying at a height of 75 m from the level ground, attached to a string inclined at 60^o to the horizontal. Find the length of the string to the nearest metre.

178) The angle of elevation of the top of a tower at a distance of 150 m from its foot on a horizontal plane is found to be 30^o . Find the height of the tower, correct to one place of decimal.

179) From the top of a lighthouse, 40 m above the water, the angle of depression of a small boat is 20^o . Estimate how far the boat is from the base of the lighthouse?

180) A boy flying a kite has let out 60 m of string. If the angle of elevation of the kite is 60^o , calculate the height of the kite above the ground.

181) The angle of elevation of the sun is 53^o . Estimate the length of the shadow cast by a tree of height 12 m.

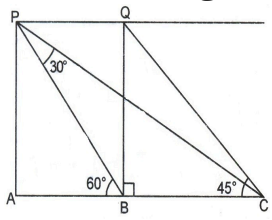
182) From a point P on the level ground, the angle of elevation of the top of tower is 30^o . If the tower is 100 m high, how far is P from the foot of tower?

183) The length of the string between a kite and a point on the ground is 90 m. The string makes an angle of 60^o with the level ground. Assuming that there is no slack in the string, find the height of the kite.

184) In a right $\triangle$ PQR, PR is the hypotenuse of length 10 cm, < PRQ = 30^o, find the area of the triangle.

185) If sun's elevation is 60^o .Find the length of the shadow of a pole of height 6m.

186) From the figure, find the angle of depression of point C from the point P.

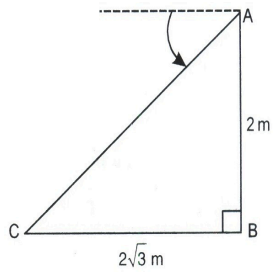


187) Write the relation between the angle of depression and the angle of elevation from an object on the ground to an object in the air

188) 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.

189) A pole 10m high cast a shadow 10m long on the ground, then find the sun,s elevation.

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



191) When the angle of elevation of the sun is 30°, then find the length of the shadow of a building 50m high.

192) Find the measure of angle of elevation of top of tower $75\sqrt{3}$ m high a point at a distance of 75m from foot of tower in a horizontal plane.

193) A ladder of 10m length touches a wall at height of 5m.Find the angle θ made by it with the horizontal

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

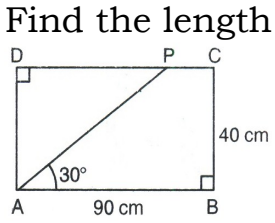
195) The angle of elevation of the top of a building 50m high, from a point on the ground is 45°. Find the distance of the point from foot of the building.

196) The angle of depression from the top of a tower 12m high, at a point on the ground is 30^0.Find the distance of the point from the top of the tower.

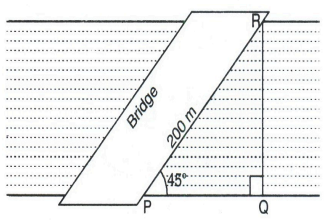
197) A circus artist is climbing a 20m long rope, which is tightly stretched and from the top of a vertical pole to the ground. Find the height of the pole, if the angle made by the rope with the ground level is 30°.

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

199) Find the length AP from the given figure.



200) A bridge across a river makes an angle of 45° with the river bank. If the length of the bridge across the river is 200m, find the width of the river.



201) A circus artist is climbing a rope 12m long which is tightly stretched and tied from the top of a vertical pole to the ground. Find the height of the pole, if the angle made by the rope with the ground is 30°

202) A kite is flying at a height of 45m above the ground. The string attached tot the kite is temporarily tied to a point on the ground is 60°. Find the length of the string assuming that there is no slack in the string.

203) A tower stands vertically on the ground. From a point on the ground which is 60m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60°. Find the height of the tower.

204) The height of a tower is 45m. If the angle of elevation of sun is 30°, find the length of the shadow formed at that time. (Take $\sqrt{3} = 1.73$)

205) A player sitting on the top of a tower of height 20m observes the angle of depression of a ball lying on the ground as 60^0.Find the distance between the foot of the tower and the ball.

206) Write true and false and justify."If the length of the shadow of a lower increasing, then the angle of elevation of the sun also increasing."

207) Write true and false and justify."The angle of elevation of the top of a tower is 30°. If the height of the tower is doubled, then the angle of elevation of its top will also be doubled."

208) Write true and false and justify."If the height of a tower and the distance of the point of observation from its foot, both, are increased by 10%, then the angle of elevation of its top remains unchanged."

209) Find the angle of elevation of the sun when the shadow of a pole h metres high is $\sqrt{3}$ h metres long

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

211) From a balloon vertically above a straight road, the angles of depression of two cars at an instant is found o be 45^0 and 60^0 .If the cars are 100m apart, find the height of the balloon.

212) The shadow of tower standing on a level plane is found to be 50m longer when sun's elevation is 30° than when it is 60°. Find the height of the tower.

213) A boy of height 1.3m spot a balloon moving with the wind in a horizontal level at some height from the ground. The angle of elevation of the balloon from the eyes of the boy at any instant is 60°. After 2seconds, the angle of elevation reduces to 30°. If the speed of the wind at that moment is $29\sqrt{3}$ m/s, then find the height of the balloon from the ground.

214) From the top of a tower h m high, the angles of depression of two objects, which are in line with the foot of the tower, are α and β $(\beta > \alpha)$ .Find the distance between the two objects.

215) Mahesh, a fireman while throwing water on the fire of a burning house noticed a child in the first floor of burning house crying help Mahesh at once tied a rope at the top of a pole near the burning house and its other end tied at the ground. He climbed the rope and from top of the pole picked the child and save her life. If the height of the pole is 12metre and the angle made by the rope with ground is 30°, calculate the distance covered by the fireman to reach the top of the pole
(i)What do you consider the act done by fireman to save the child?

216) The angle of elevation of the top of the building of an organisation working for poor and needy children at a point on level ground is 45°. After moving 100m towards the building along the same horizontal line, the angle of elevation of the building is 60^0 .Find the height of the building.
(i)Which mathematical concept is being used here?
(ii)Which social act is being discussed here?

217) Two cleanliness hoardings are put on two poles of equal height standing on either side of a roadway 50m wide between the poles. The elevation of the top of the poles from a point between them are 60° and 30°. Find the height of each pole and the position of this point. Which social act is being discussed here and write its role in the development of society?

218) A man standing on the bank of the river observes that the angle of elevation of the top of the building of an organisation working for conservation of wildlife, standing on the opposite bank is 60^0.When he moves 40 metres away from the bank, he finds the angle of elevation to be 45^0 .Find the height of the building and the width of the river.
(a) Why do we need to conserve wildlife?
(b) Suggest some step that can be taken to conserve wildlife.

219) A tree is broken by wind.The top struck the ground at an angle of 30^0 and at a distance of 30m from the root.Find the whole height of the tree

220) A man on the top of a tower observes a trunk at an angle of depression α, where tan $\alpha = \frac{1}{\sqrt{5}}$ and sees that it is moving towards the base of the tower.Ten minutes later the angle of depression of the truck is found to be β, where tan $\beta = \sqrt{5}$ .Assuming that truck moves at a uniform speed, determine how much more time it will take to reach the base of the tower.

221) The horizontal distance between two trees of different height is 60 m. The angle of elevation of the top of the first tree when seen from the bottom of the second tree is 30º, find the height of the first tree.If height of second tree is $60\sqrt{3}$ m, then find the angle of elevation of the top of second tree when seen from the bottom of first tree.

222) Two pillars of equal heights are on either side of a road which is 100m wide. The angles of elevation of the top of the pillars are 30º and 60º at a point on the road between the pillars. Find the position of the point between the pillars and the height of each pillar.

223) Two vertical lampposts of equal height stand on either side of a roadway 50m wide between lampposts. The elevations of the tops of the lampposts from a point between the lampposts from a point between the lampposts are 60º and 30º. Find the height of each lamppost and the position of this point.

224) The angel of elevation of an aeroplane from a point on the ground is 45º. After a flight for 15 seconds, the elevation changes to 30º. If the aeroplane is flying at a height of 3000m, find the speed of the aeroplane.

225) At the foot of a mountain the elevation of its summit is 45º. After ascending 1.5km towards the top of the mountain up an inclination of 30º, the elevation changes to 60º. Find the height of the mountain.

226) The angle of elevation of a jet fighter from a point A on the ground is 60º.After 15 seconds flight, the angle of elevation changes from 60º to 30º. If the jet is flying at a speed of 200m/sec, find the height at which the jet fighter is flying.

227) A man is standing on the deck of a ship, which is 8m above water level.He observes the angle of elevation of the top of a hill as 60^0 and the angle of depression of the base of the hill as 30^0 .Calculate the distance of the hill from the ship and the height of the hill.

228) A man on the deck of a ship is 12 m above the water level.He observes that the angle of elevation of the top of a cliff is 45^0 and the angle of depression of the base is 30^0.Calculate the distance of the cliff from the ship and the height of the cliff

229) A man on the deck of a ship is 16m above the water level.He observes that the angle of elevation of the top of a cliff is 45^0 and the angle of depression of the base is 30^0.Calculate the distance of the cliff from the ship and the cliff.

230) The angle of elevation of a cloud from a point 60m above a lake is 30^0 and the angle of depression of the reflection of the cloud in the lake is 60^0.Find the height of the cloud.

231) The angles of elevation and depression of the top and bottom of a lighthouse from the top of a building, 60m high, are 30^0 and 60^0 respectively.
Find:
(i)the difference between the heights of the lighthouse and the building.
(ii)distance between the lighthouse and the building.

232) A 1m tall boy is standing at some distance from a 21m tall building.The angle of elevation from his eyes to the top of the building increases from 30^0 to 45^0 as he walks towards the building.Find the distance he walked towards the building

233) If a man standing on a platform 3m above the surface of a lake, then the angle of elevation of the cloud is equal to the angle of depression of its reflection.Write true or false and justify.

234) A man on the deck of a ship is 10m above water level.He observes that the angle of elevation of the top of a hill is 60^0 and the angle of depression of the base of the hill is 30^0.Calculate the distance of the hill from the ship and the height of the hill.

235) The angles of depression of top and bottom of tower as seen from the top of a 100m high cliff are 30^0 and 60^0 respectively.Find the height of the tower.

236) A bird is sitting on the top of a tree which is 60m high.The angle of elevation of the bird from a point on the ground is 45^0.the bird flies away from the point o observation horizontally and remains at a constant height.After 2seconds, the angle of elevation of the bird from the point of observation becomes 30^0 .Find the speed of flying of bird.

237) A straight highway leads to the foot of the tower of height 50m.From the top of the tower, the angles of depression of two cars standing on the highways are 30^0 and 60^0.What is the distance between the two cars and how far is each car from the tower?While travelling in a car:
(i)One should always wear seat belt.
(ii)One should only wear seat belt when it is a long drive.
(iii)One driver should wear seat belt.
(iv)Only adult in the car should wear seat belt.

238) From a parachute vertically above a straight road, the angles of depression of two accidental vehicles, at an instant is found to be 45^0 and 60^0.If the vehicles are 100m apart, find the height of the parachute. Which precautions one should take to avoid accidents on roads?

239) A tree breaks due to wind and heavy storm, the broken part bends so that top of the tree touches the ground making an angle 30^0 with it.The distance between the foot of the tree to the point where the top touches the ground is 8m.Teacher asked the students to find the height of the tree.Only one student Param took the initivative and calculated it correctly.What is the height of the tree?Which quality of Param is depicted here?Which mathematical concept is being used here?

240) From a window 60m high above of an organisation working for consumer protection, the angles of depression of two cars on the straight road leading to the foot of the building are 30^0 and 60^0.If one car is exactly the other, find the distance between the two cats.(Use $\sqrt{3} = 1.732$)
(i)What do you understand by consumer protection?
(ii)Write the role of such organisation in a society.

241) From a point 100m above lake, the angle of elevation of stationary helicopter is 30^0 and angle of depression of the helicopter in the lake is 60^0.Find the height of the helicopter.

242) A pole of height 5m is fixed on the top of a tower.The angle of elevation of the top of the pole as observed from a point A on the ground is 60^0 and the angle of depression of the point A from top of the tower is 45^0.Find the height of the tower.

243) From the top of a 7m high building, the angle of elevation of the top of a tower is 60^0 and the angle of depression of the foot of the tower is 30^0 find the height of the tower.

244) From the top of a vertical tower, the angles of depression of two cars, in the same straight line with the base of the tower, at an instant are found to be 45^0 and 60^0.if the cars are 100m apart and are the same side of the tower, find the height of the tower.$[Use\ \sqrt{3} = 1.73]$

245) 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.

246) The hypotenuse of a right triangle is 4 times the smallest side.The third side is $\sqrt{735}$ .Find the hypotenuse and the smallest side.

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

248) A vertical stick 10m casts a shadow 8m long.At the same time a tower casts a shadow 32m long.Then the height of the tower is

249) The angle of elevation of the top of the tower from a point on the ground which is 30m away from foot of the tower is 30^0.the height of the tower is.

250) A boy flying a kite has let out 60m of string if the angle of elevation of the kite is 60^0 , then the height of the kite above the ground is

251) A girl of height 100cm stands in front of lamppost and cast a shadow of length $100\sqrt{3}$ cm on the ground.The angle of elevation of the top of the lamppost is

252) A circus artist is climbing a 18m long rope which is tightly stretched and tied from the top of a vertical pole to the ground level is 30^0, then find the height of the pole.

253) the height of a tower is 12m.Find the height of its shadow when sun's altitude is 45^0 .

254) A 4m tall tree casts a shadow of length m.If at the same time a flagpole casts a shadow 40m in length, then the find the length of the flagpole.

255) A kite is flying at a height of 20m from the ground.the length of the string from the kite to the ground 40m.assuming that there is no slack in the string, find the angle of elevation of the kite at the ground.

256) A tree is broken by the wind, the top struck the ground at an angle of 60^0 and at a distance of 20m from the root of the tree.Then find the whole height of the tree.

257) A vertical stick 10m long casts a shadow 6m long.At the same time a tower casts a shadow 30m long.Then, find the height of the tower.

258) A boy flying a kite has let out 30m of string.If angle of elevation of the kite is 30^0, then find the height of the kite above the ground.

259) A girl of height 80cm stands in front of lamppost and casts a shadow of length $80\sqrt{3}$ cm on the gound.Find the angle of the top of the lamppost.

260) The height of a tower is 42m.If the angle of elevation of sun is 30^0, find the length of the shadow formed at that time.

261) A player sitting on the top height 18m observes the angle of depression of a ball lying on the ground as 60^0.Find the distance between the foot of the tower and the ball.

262) A player sitting on the top of a tower of height 40m observes the angle of depression of a ball lying on the ground as 60^0.The distance between the foot of the tower and ball is

263) A tower is 50m high.Its shadow is x metres shorter, when the sun's altitude is 45^0 than when it is 30^0, then x=

264) The angle of depression of the top of a tower at a point 100m from the house is 45^0 , then the height of the tower is

265) In the length of the shadow of a tower is increasing, then the angle of elevation of the Sin is also increasing. Is it true? Justify your answer.

266) A ramp for disabled people in a hospital have slope not more than 30°. If the height of the ramp be 1 m, then find the length of ramp.

267) Find the height of a tree, if it casts a shadow 17 m long on the level of ground, when the angle of elevation of the Sun is 45° .

268) From a point 20 m away from the foot of a tower, the angle of elevation of the top of the tower is 30° . Find the height of the tower. [Take, $\frac{20}{\sqrt{3}=1.732}$]

269) In the height and length of the shadow of a man are the same, then find the angle of elevation of the Sun.

270) If the Sun's angle of elevation is 60° and height of the pole is 6 m, then find the length of the shadow.

271) The angle of elevation of the top of a building 150 m high, from a point on the ground is 45°. Find the distance of the point from foot of the building.

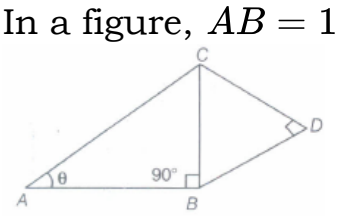
272) The tops of two poles of height 20 m and 14 m are connected by a wire makes an angle of 30° with the horizontal, then find the length of the wire.

273) Find the length of the shadow on the ground of a pole of height 6 m when the angle of elevation θ of the Sun is such that $tan \quad \theta = \frac{3}{4}$.

274) A circus artist is climbing on a 10 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 45°, then find the height of pole.

275) A tower stands near an airport. The angle of elevation θ of the tower from a point on the ground is such that its tangent is $\frac{5}{12}$. Find the height of the tower, if the distance of the observer from the tower is 120 m.

276) In a figure, $AB = 10\sqrt{3},\ DC = 8$ cm and BD = 6cm, then find θ .



277) 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 30° . Calculate the distance covered by the artist in climbing to the top of the pole.

278) In right angled $\Delta ABC, AC$ is hypotenuse, $AB = 12cm \& \angle BAC = 30^\circ$. Then, find the length of the side BC.

279) A 6 ft tall man finds that the angle of elevation of a 24 ft high pillar and the angle of depression of its base are complementary angles. Find the distance of the man from the pillar.

280) When the length of the shadow of a pole is equal to $\sqrt{3}$ times the height of the pole, then find the angle of elevation of source of light.

281) What will be the angle of elevation of the top of a 15m high tower at a point 15 m away from the base of the tower?

282) Find the angle of elevation of the Sun, if the length of the shadow of a tower is $\frac{1}{\sqrt{3}}$ times the height of the tower.

283) If two towers of heights h_1 and h_2 subtend angles of 45° and 30° , respectively at the mid-point of the line joining their feet, then ratio of $h_1 : h_2$.

284) Air balloon is connected to a meteorological ground station by a cable of length 2000m and inclined at 60° to the ground. Find the height of the balloon from the ground, assuming no slackness in it.

285) 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.

286) A hill slopes upwards at an angle of 30° with the horizontal.What height does a man rise, when he walks 100m up the hill?

287) The tops of two poles of heights 16 m and 10 m are connected by a wire. If the wire makes an angle of 30° with the horizontal, then find the width of the river.

288) A bridge in the shape of a straight path, across a river, makes an angle of 60° with the width of the river. If the length of the bridge is 100 m, then find the width of the river.

289) A ladder is placed against a wall of a house such that its upper end is touching the top of the wall. The foot of the ladder is 8 m away from the foot of the wall and the ladder is making an angle of 30° with the level of the ground. Determine the height of the wall.

290) The angles of elevation of the top of a rock from the top and foot of a 60 m high tower are 45° and 60° , respectively. Find the height of the rock.

291) From a point on the ground 40 m away from the foot of a tower, the angle of elevation of the top of the tower is 30° . The angle of elevation of the top of a water tank (on the top of the tower) is 45° . Find (i) height of the tower (ii) depth of the tank.

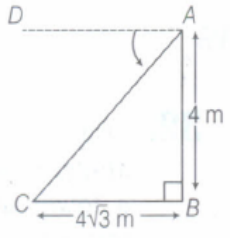
292) From the top of a lighthouse 40 m above the water, the angle of depression of a small boat is 20° Estimate how far the boat is form the base of the light house?

293) The string of a kite is 100 m long. If the string is in the form of a straight line (there is no slack in the string) and makes an angle of θ with the level ground such that $\sin\theta = \frac{8}{15}$, then find the height of the kite.

294) From the first floor of Qutab Minar which is at a height of 25 m from the level ground, a man observes the top of a building at an angle of elevation of 30° and the angle of depression of the base of the building to be 60°. Calculate the height of the building.

295) From the top of a lighthouse, 40 m above the water, the angle of depression of a small boat is 45° Estimate how far the boat is from the base of the lighthouse?

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



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

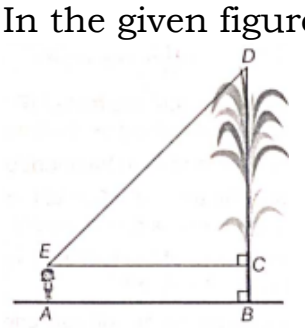
298) If the length of the shadow of a tower is increasing, then the angle of elevation of the Sun is also increasing. Is it true? Justify your answer.

299) A tower stands vertically on the ground. From a point on the ground which is 20 m away from of the foot of the tower, the angle

300) 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.

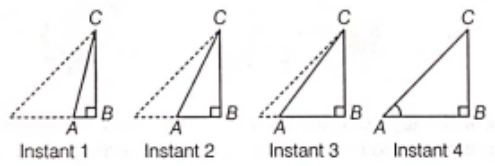
301) An observer, 1.5 m tall, is 20.5 m away from a tower 22 m high. Determine the angle of elevation of the top of the tower from the eye of the observer.

302) In the given figure, the height of the girl is 1.5 m and the height of the tree is 13.5 m.



(Note The figure is not to scale.)
If AB= 12√3 m, what is the angle of elevation of the top of the tree from her eyes?

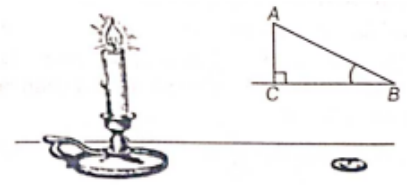
303) At the toll plaza, a traffic monitoring camera is installed at a height of 6.2 m. It takes pictures of moving vehicles at regular intervals.
The diagram below shows the position of the camera and a car moving away from it after paying the toll in four instances. The speed of the car is 5 m/s



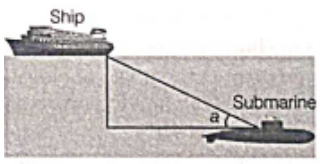
Based on the above information, answer the following questions.
The angle made by the camera to the car in instance 1 is 30° and changes to 60° in instance 4. What is the distance moved by the car?(√3 = 1.73)

304) 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.

305) 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.



306) Shown below is a submarine scouting an enemy ship in the ocean using a sonar device. Sonar devices send out a sound pulse from a transducer, and then precisely measure the time it takes for the sound pulses to be reflected back to the transducer.



A sonar wave sent by the submarine hits the ship and returns back in 2 sec. The speed of a sonar wave underwater is 1500 m/s and the submarine is diving at a depth of 750 m below sea level.
Find the angle of elevation a of the ship from the submarine. Show your steps.

3 Marks 49 x 3 = 147

307) 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^o and angle of depression of the base of the hill as 30^o. Find the distance of the hill from the ship and height of the hill.

308) The angle of elevation of the top of a tower from a point A on the ground is 30^o. On moving a distance of 20 meters towards the foot of the tower to a point B, the angle of elevation increases to 60^o . Find the height of the tower and distance of the tower from the point A. $(\sqrt{3} = 1.732)$

309) A pole 5 m high is fixed on the top of a tower. The angle of elevation of the top of the pole observed from a point 'A' on the ground is 60^o and the angle of depression of the point 'A' from the top of the tower is 45^o . Find the height of the tower. $(\sqrt{3} = 1.73)$

310) A statue 1.46 m tall stand on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is 60^o and from the same point, the angle of elevation of the top of the pedestal is 45^o . Find the height of the pedestal. $(\sqrt{3} = 1.73)$.

311) On a horizontal plane there is a vertical tower with a flag pole on the top of the tower. At a point 9 metres away from the foot of the tower the angles of elevation of the top and bottom of the flag pole are 60^o and 30^o respectively. Find the heights of the tower and flag pole mounted on it.

312) The shadow of a flagstaff is three times as long as the shadow of the flagstaff when the sunrays meet the ground at an angle of 60^o . Find the angle between the sunrays and the ground at the time of longer shadow.

313) A man rowing a boat away from a lighthouse 150 m high takes 2 minutes to change the angle of elevation of the top of lighthouse from 45^o to 30^o. Find the speed of the boat. $(Use\sqrt{3} = 1.732)$

314) A person standing on the bank of a river observes that the angle of the elevation of the top of a tree standing on the opposite bank is 60° . When he moves 40 m away from the bank, he finds the angle of elevation to be 30° . Find the height of the tree and the width of the river. $(\sqrt{3} = 1.732)$.

315) 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^o and 60^o 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.

316) A ladder of length 6 m makes an angle of 45^o 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^o with the floor. Find the distance between these two walls of the room.

317) 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^o . If the height of the second pole is 24 m, find the height of the first pole. $(Use\sqrt{3} = 1.732)$

318) From a window (60 metres high above the ground) of a house in street the angles of elevation and depression of the top and the foot of another house on opposite side of street are 60^o and 45^o respectively. Show that the height of the opposite house is $60(1 + \sqrt{3})$ metres.

319) Two boats approach a lighthouse in mid - sea from opposite directions. The angles of elevations of the top of the lighthouse from two boats are 30^o and 45^o respectively. If the distance between two boats is 100 m, find the height of the lighthouse.

320) A peacock is sitting on the top of a tree. It observes a serpent on the ground making an angle of depression of 30^o . The peacock with the speed of 300 m/minute catches the serpent in 12 seconds. What is the height of the tree?

321) The angle of elevation of the top Q of a vertical tower PQ from a point X on the ground is 60° From a point Y, 40m vertically above X, the angle of elevation of the top Q of tower is 45° . Find the height of the tower PQ and the distance PX. (Use $\sqrt{3} = 1.73$)

322) A spherical balloon of radius 'r' subtends an angle θ at the eye of an observer.If the angle of elevation of is ϕ, find the height of the centre of the balloon.

323) From a balloon vertically above a straight road, the angles of depression of two cars at an instant are found to be 45^0 and 60^0.If the cars are 100m apart, find the height of the balloon.

324) The angle of elevAtion of the top of a tower as observed from a point on the ground is α and on moving p m towards the tower, the angle of elevation is β.Prove that the height of the tower is $\frac{P\,tan\alpha.tan\beta}{tan\beta - tan\alpha}$

325) A ladder rests against a vertical wall at an inclination α to the horizontal.Its foot is pulled away from the wall through a distance 'a' so that its upper and slides a distance 'b' down the wall and then the ladder makes an angleβ to the horizontal.Show that: $\frac{a}{b} = \frac{cos\beta - cos\alpha}{sin\alpha - sin\beta}$

326) An aeroplane is at an altitude of 1200 m. Find that two ships are sailing towards it in the same direction. The angles of depression of the ships as observed from the aeroplane are 60° and 30° , respectively. Find the distance between both ships.

327) The angles of depression of two consecutive kilometre stones on the road on right and left of an aeroplane are 60° and 45° , respectively as observed from the aeroplane. Find the height of the aeroplane.

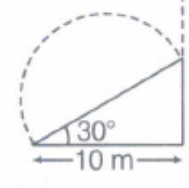
328) An observer 1.75m tall is at a distance of 24 m from a wall 25.75 m high. Find the angle of elevation of the top of the wall at the observer's eye

329) A vertical tower is $2\sqrt{3}m$ high and the length of its shadow is 2 m. Find the angle of elevation of the source of light.

330) A man who is $1\frac{3}{4}$ tall sees that angle of elevation

331) From the top of a hill $200\sqrt{3}$ m high, the angle of depression of a ship moving towards the hill is 30°. After 2 min, its angle of depression becomes 60°. Find the speed of the ship assuming it to be uniform.

332) The top of a broken tree has its top touching the ground (shown in the following figure) at a distance of 10 m from the bottom. If the angle made by the broken part with ground is 30°, then find the length of the broken part.



333) The angle of elevation of an aeroplane from a point on the level ground is 60°. After 10 s of flight, the angle of elevation changes to 30°. If the aeroplane is flying horizontally at a height of 3000 m, then find the speed of the plane.

334) The angle of elevation of the top of a tower from the bottom of a tree is 60° and the angle of elevation of the top of tree from the foot of the tower is 30°. If the tower is 50 m tall, then what is the height of the tree?

335) A highway leads to the foot of 300 m high tower. An observatory is set at the top of the tower. It sees a car moving towards it with an angle of depression becomes 60°.
(i) Find the distance travelled by the car during this time.
(ii) How this observatory is helpful to regulate the traffic on the highway?

336) An Aeroplane at an altitude of 200 m observes the angle of depression of opposite points on the two banks of a river to be 45° and 60° .Find width of the river.

337) An aeroplane, when flying at a height of 400m from the ground, passes vertically above another aeroplane at an instant when the angles of elevation of two plans from the same point on the ground are 60° and 45° , respectively. Find the vertical distance between the aeroplanes at that instant.

338) From a 60 m high building, the angle of depression of the top and bottom of a lamppost are 30° and 60° , respectively. Find the distance between lamppost and building. Also, find the difference of heights between building and lamppost.

339) An aeroplane, when 3000 m high, passes vertically above another aeroplane at an instant, when the angles of elevation of the two aeroplanes from the same point on the ground are 60° and 45° , respectively, Find the vertical distance between the two aeroplanes.

340) The angle of elevation of a jet fighter from a point A on the ground is 60° . After a flight of 10 s, the angle of elevation charge to 30° . If the jet is flying at a speed of 432 Km/h, then find the constant height at which the jet is flying.

341) Determine the height of a mountain, if the elevation of its top at an unknown distance from the base is 30° and at a distance 10 km further off from the mountain, along the same line, the angle of elevation is 15° (Take tan 15° = 0.27)

342) Sunita is an electrician and she has to repair an electric fault on a pole of height 5 m. She needs to reach to a point on the pole 1.3 m below the top of the pole to undertake the repair work. What should be the length of the ladder that she should use which, when inclined at an angle of 60° from the horizontal, would enable her to reach the required position? Further, how far from the foot of the pole should she place the foot of the ladder? What value is indicated from this question?

343) Sachin is a fireman worker. When he throws water on the fire of burning house, he notice that one child is crying for getting help. At once Sachin tied a rope at the top of a pole near the burning house and its other end tied at the ground. He climbed the rope and from the top of the pole picked the child and save their life. Suppose the height of the pole is 20 m and the angle made by the rope with ground is 60°.
(i) Calculate the distance covered by the fireman to reach the top of the pole.
(ii) Find the distance between the foot of the pole and where he tied the rope at the ground.

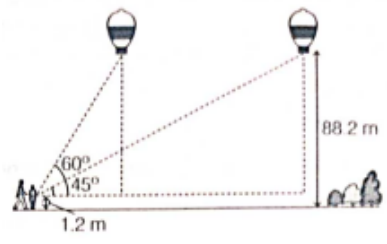
344) From the top of a building 60 m high, the angles of depression of the top and bottom of a tower are observed to be 45° and 60°, respectively. Then, find the height of the tower. [take, 13 = 1.732]

345) Sunita is an electrician and she has to repair an electric fault on a pole of height 8 m. She needs to reach to a point on the pole 3 m below the top of the pole to undertake the repair work.
(i) What should be the length of the ladder that she should use which, when inclined at an angle of 30° from the horizontal, would enable her to reach the required position?
(ii) Howfar fromthe footof the pole should she place the footofthe ladder.
(iii) The space between the pole and ladder is in the triangular shape, find its area.

346) A vertical tower stands on a horizontal plane and is surmounted by a vertical flag staff of height h. At a point on the plane, the angles of elevation of the bottom and the top of the bottom and the top of the flag staff are α and β, respectively. Prove that the height of the tower is $\left(\frac{h\tan\alpha}{\tan\beta-\tan\alpha}\right)$.

347) A window of a house is h m above the ground. From the window, the angles of elevation and depression of the top and the bottom of another house situated on the opposite side of the lane are found to be α and β, respectively. Prove that the height of the other house is h (1+ tan α cot β) m.

348) A 1.2 m tall girls pots a balloon moving with the wind in a horizontal linc at a height 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girlat any instant is 60°. After sometime, the angle of clevation reduces 45°. Find the distance travelled by the balloon during the interval.

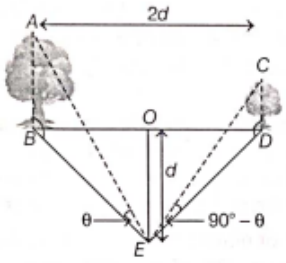


349) A boy standing on a horizontal plane finds a bird flying at a distance of 100 m from him at an elevation of 30°. A girl standing on the roof of a 20 m high building, finds the elevation of the same bird to be 45°. The boy and the girl are on the opposite sides of the bird. Find the distance of the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

350) 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.

351) There is a smallisland in the middle of a 100 m wide river and at all tree stands on the island. P and Q are points directly opposite to each other on two banks and in line with the tree. Suppose the angles of elevation of the top of the tree from P and Q are respectively 30° and 45°.
(i) Find the height of the tree. (√3=1.732)
(ii) Determine the distance between two trees. (ii) Which point is farthest from the island?

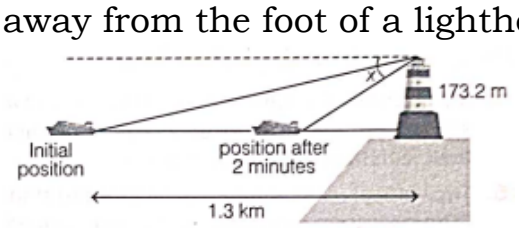
352) Two trees are 2d m apart. Ajay stood at a point midway between them and started walking in a direction perpendicular to the line connecting the tWo trees. After walkingd metres, he observed the angle of elevations to the tops of the two trees and found them to be complementary.



(Note The figure is not to scale.)
If one of the trees is thrice as tallas the other, find the height of the shorter tree, in terms of d. Show your work

353) 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)]

354) A ship was moving towards the shore at a uniform speed of 36 km/h. Initially, the ship was 1.3 km away from the foot of a lighthouse which is 173.2 m in height.

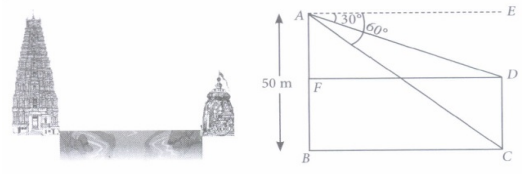


(Note The figure is not to scale.)
Find the angle of depression x of the top of the lighthouse from the ship after the ship had been moving for 2 min. Show your steps and give reasons.
[take (√3 =1.732)]

355) A man standing on the deck of a ship, which is 10 m above the water level. He observes the angle of elevation of the top of a hill is 60° and the angle of depression ofthe base of the hill is 30°.Calculate the distance of the hill from the ship andheight of the hill.

Case Study Questions 20 x 4 = 80

356) There are two temples on each bank of a river. One temple is 50 m high. A man, who is standing on the top of 50 m high temple, observed from the top that angle of depression of the top and foot of other temple are 30° and 60° respectively. (Take $\sqrt{3}$ = 1.73)



Based on the above information, answer the following questions.

(i) Measure of $\angle$ ADF is equal to

(a) 45° (b) 60° (c) 30° (d) 90°

(ii) Measure of $\angle$ ACB is equal to

(a) 45° (b) 60° (c) 30° (d) 90°

(iii) Width of the river is

(a) 28.90 m (b) 26.75 m (c) 25 m (d) 27 m

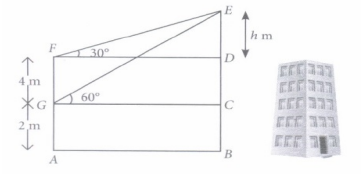
(iv) Height of the other temple is

(a) 32.5 m (b) 35 m (c) 33.33 m (d) 40 m

(v) Angle of depression is always

(a) reflex angle (b) straight
(c) an obtuse angle (d) an acute angle

357) There are two windows in a house. First window is at the height of 2 m above the ground and other window is 4 m vertically above the lower window. Ankit and Radha are sitting inside the two windows at points G and F respectively. At an instant, the angles of elevation of a balloon from these windows are observed to be 60° and 30° as shown below



Based on the above information, answer the following questions.

(i) Who is more closer to the balloon?

(a) Ankit (b) Radha
(c) Both are at equal distance (d) Can't be determined

(ii) Value of DF is equal to

$(a)\frac{h}{\sqrt{3}}$ m $(b)h\sqrt{3}$ m $(c)\frac{h}{2}$ m $(d)2h$ m

(iii) Value of h is

(a) 2 (b) 3 (c) 4 (d) 5

(iv) Height of the balloon from the ground is

(a) 4 m (b) 6 m (c) 8 m (d) 10 m

(v) If the balloon is moving towards the building, then both angle of elevation will

(a) remain same (b) increases (c) decreases (d) can't be determined

358) A circus artist is climbing through a 15 m long rope which is highly stretched and tied from the top of a vertical pole to the ground as shown below. Based on the above information, answer the following questions.

(i) Find the height of the pole, if angle made by rope to the ground level is 45°.

$(a) 15$ m $\quad (b) 15\sqrt{2}$ m

$(c) \frac{15}{\sqrt{3}}$ m $\quad (d) \frac{15}{\sqrt{2}}$ m

(ii) If the angle made by the rope to the ground level is 45°, then find the distance between artist and pole at ground level.

$(a) \frac{15}{\sqrt{2}}$ m $\quad (b) 15\sqrt{2}$ m $\quad (c) 15$ m $\quad (d) 15\sqrt{3}$ m

(iii) Find the height of the pole if the angle made by the rope to the ground level is 30°.

(a) 2.5 m (b) 5 m (c) 7.5 m (d) 10 m

(iv) If the angle made by the rope to the ground level is 30° and 3 m rope is broken, then find the height of the pole

(a) 2m (b) 4m (c) 5m (d) 6m

(v) Which mathematical concept is used here?

(a) Similar Triangles	**(b) Pythagoras Theorem**
(c) Application of Trigonometry	**(d) None of these**

359) There is fire incident in the house. The house door is locked so, the fireman is trying to enter the house from the window. He places the ladder against the wall such that its top reaches the window as shown in the figure .

Based on. the above information, answer the following questions.

(i) If window is 6 m above the ground and angle made by the foot ofladder to the ground is 30°, then length of the ladder is

(a)	**(b)**	**(c)**	**(d)**
8m	**10m**	**12m**	**14m**

(ii) If fireman place the ladder 5 m away from the wall and angle of elevation is observed to be 30°, then length of the ladder is

(a) 5 m $(b) \frac{10}{\sqrt{3}}$ m $\quad (c) \frac{15}{\sqrt{2}}$ m **(d) 20 m**

(iii) If fireman places the ladder 2.5 m away from the wall and angle of elevation is observed to be 60°, then find the height of the window. (Take $\sqrt{3}$ = 1.73)

(a) 4.325 m	**(b) 5.5 m**	**(c) 6.3 m**	**(d) 2.5 m**

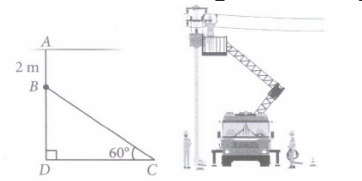
(iv) If the height of the window is 8 m above the ground and angle of elevation is observed to be 45°, then horizontal distance between the foot of ladder and wall is

(a) 2 m (b) 4 m (c) 6 m (d) 8 m

(v) If the fireman gets a 9 m long ladder and window is at 6 m height, then how far should the ladder be placed?

(a) 5 m (b) $3\sqrt{5}$ **m (c) 3 m (d) 4 m**

360) An electrician has to repair an electric fault on the pole of height of8 m. He needs to reach a point 2 m below the top of the pole to undertake the repair work.



Based on the above information, answer the following questions.

(i) Length of BD is

(a) 10 m(b) 6 m(c) 4 m(d) 4 m

(ii) What should be the length of ladder, so that it makes an angle of 60° with the ground?

$(a)4\sqrt{3}\,m \quad (b)2\sqrt{3}\,m \quad (c)3\sqrt{3}\,m \quad (d)5\sqrt{3}\,m$

(iii) The distance between the foot ofladder and pole is

$(a)6\sqrt{3}\,m \quad (b)4\sqrt{3}\,m \quad (c)3\sqrt{3}\,m \quad (d)2\sqrt{3}\,m$

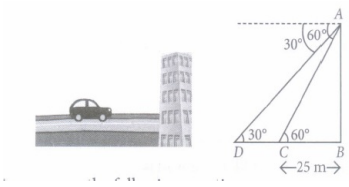
(iv) What will be the measure of $\angle$ BCD when BD and CD are equal?

(a) 30° (b) 45° (c) 60° (d) 75°

(v) Find the measure of $\angle$ DBC.

(a) 15° (b) 60° (c) 30° (d) 45°

361) Rohit is standing at the top of the building observes a car at an angle of 30°, which is approaching the foot of the building with a uniform speed. 6 seconds later, angle of depression of car formed to be 60°, whose distance at that instant from the building is 25 m.



Based on the above information, answer the following questions.

(i) Height of the building is

$(a)25\sqrt{2}\,m$ **(b) 50 m** $(a)25\sqrt{3}\,m$ **(d) 25 m**

(ii) Distance between two positions of the car is

(a) 40 m **(b) 50 m** **(c) 60 m** **(d) 75 m**

(iii) Total time taken by the car to reach the foot of the building from starting point is

(a) 4 sec. **(b) 3 sec.** **(c) 6 sec.** **(d) 9 sec.**

(iv) The distance of the observer from the car when it makes an angle of 60° is

(a) 25 m **(b) 45 m** **(c) 50 m** **(d) 75 m**

(v) The angle of elevation increases

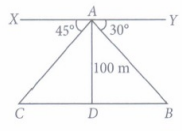
(a) when point of observation moves towards the object

(b) when point of observation moves away from the object

(c) when object moves away from the observer

(d) None of these

362) A boy is standing on the top of light house. He observed that boat P and boat Q are approaching to light house from opposite directions. He finds that angle of depression of boat P is 45° and angle of depression of boat Q is 30°. He also knows that height of the light house is 100 m.



Based on the above information, answer the following questions.

(i) Measure of ∠ACD is equal to

(a) 30° (b) 45° (c) 60° (d) 90°

(ii) If ∠YAB = 30°, then ∠ABD is also 30°, Why?

(a) vertically opposite angles (b) alternate interior angles

(c) alternate exterior angles (d) corresponding angles

(iii) Length of CD is equal to

(a) 90 m (b) 60 m (c) 100 m (d) 80 m

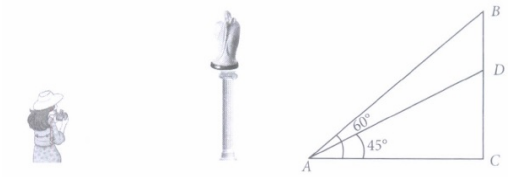
(iv) Length of BD is equal to

(a) 50 m (b) 100 m (c) $100\sqrt{2}$ m (d) $100\sqrt{3}$ m

(v) Length of AC is equal to

(a) $100\sqrt{2}$ m (b) $100\sqrt{3}$ m (c) 50 m (d) 100 m

363) In an exhibition, a statue stands on the top of a pedestal. From the point on ground where a girl is clicking the photograph of the statue 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 pedestal is 45°.



Based on the above information, answer the following questions.

(i) If the height of the pedestal is 20 m, then the distance between girl and the foot of the pedestal is

(a) 20m (b) 40m (c) 60m (d) 80m

(ii) If the height of the pedestal is 20 m, then the height of the statue is

$(a) 20\sqrt{3}\,\text{m}$ $(b) 20(\sqrt{3}-1)\text{m}$ $(c) 20(\sqrt{3}+1)\text{m}$ $(d) 10(\sqrt{3}-1)\text{m}$

(iii) If the height of the statue is 1.6 m, then height of the pedestal is

$(a) 0.8(\sqrt{3}-1)\text{m}$ $(b) 1.6(\sqrt{3}+1)\text{m}$ $(c) 0.8(\sqrt{3})\text{m}$ $(d) 0.8(\sqrt{3}+1)\text{m}$

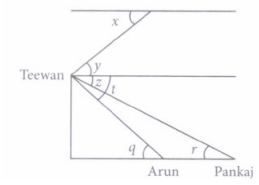
(iv) If the total height of the statue and pedestal is 39 m, then find the length of AC.

(a) 13 m (b) $12\sqrt{3}$ m (c) $13\sqrt{3}$ m (d) $15\sqrt{3}$ m

(v) If the height of the pedestal is 35 m, then length of AD is

(a) $35\sqrt{2}$ m **(b)** $40\sqrt{2}$ m **(c)** $35\sqrt{2+1}$ m **(d)** $35\sqrt{2-1}$ m

364) Teewan, Arun and Pankaj were celebrating the festival of Diwali in open ground with firecrackers. There is a pedestal in the ground. All of sudden Teewan stands on pedestal and release sky lantern from the top of pedestal.



Based on the above information answer the following questions. (Take $\sqrt{3}$ = J .73)

(i) Which one is a pair of angle of depression?

$(a)(\angle x, \angle y)$ $(b)(\angle y, \angle z)$ $(c)(\angle z, \angle t)$ $(d)(\angle r, \angle q)$

(ii) If the position of Pankaj is 25 m away from the base of pedestal and Zr = 30°, then find the height of pedestal.

(a)	**(b)**	**(c)**	**(d)**
14.45m	**15.5m**	**16.36m**	**17.36m**

(iii) If the height of pedestal is 30 m, ∠ t = 45° and ∠ z = 30°, then the horizontal distance between Arun and Pankaj is

(a) 24.5 m(b) 19.5 m(c) 20 m(d) 21.9 m

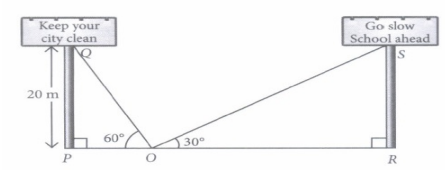
(iv) If the vertical height of sky lantern from the top of pedestal is 12 m and ∠ y = 30°, then distance between Teewan and sky lantern is

(a) 20 m	**(b) 16.97 m**	**(c) 24 m**	**(d) 19.86 m**

(v) If ∠ q = 60° and position of Arun is 15 m away from the base of pedestal, then find the height of pedestal.

(a) 16.25 m	**(b) 25 m**	**(c) 25.95 m**	**(d) 26 m**

365) Two hoardings are put on two poles of equal heights standing on either side of the road. From a point between them on the road the angle of elevation of the top of poles are 60° and 30° respectively. Height of the each pole is 20 m.



Based on the above information, answer the following questions. (Take $\sqrt{3}$ = 1.73).

(i) Find the length of PO.

(a) 20 m	$(b)20\sqrt{3}$ m	$(c)\frac{20}{\sqrt{3}}$ m	**(d) None of these**

(ii) Find the length of RO.

(a) 20 m	$(b)20\sqrt{3}$ m	$(c)\frac{20}{\sqrt{3}}$ m	**(d) None of these**

(iii) The width of the road is

(a) 31.23m	**(b) 35.68 m**	**(c) 39.73 m**	**(d) 46.24 m**

(iv) If the angle of elevation made by pole PQ is 45°, then the length of PO =

(a) 20 m	$(b)20\sqrt{3}$ m	$(c)\frac{20}{\sqrt{3}}$ m	**(d) None of these**

(v) Angle formed by the line of sight with the horizontal when the point being viewed is above the horizontal level is known as

(a) angle of depression	**(b) angle of elevation**	**(c) right Angle**	**(d) reflex angle**

366) Suppose a straight vertical tree is broken at some point due to storm and the broken part is inclined at a certain distant from the foot of the tree. Based on the above information, answer the following questions.

(i) If the top of upper part of broken tree touches ground at a distance 000 m (from the foot of the tree) and makes an angle of inclination 30°, then the height of remaining part of the tree is

$(a)\sqrt{3}\,\text{m}$ $(b)30\sqrt{3}\,\text{m}$ $(c)\frac{30}{\sqrt{3}}\,\text{m}$ **(d) 30 m**

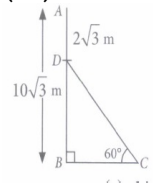
(ii) If the top of broken part of a tree touches the ground at a point whose distance from foot of the tree is equal to height of remaining part, then its angle of inclination is

(a) 30° (b) 60° (c) 45° (d) None of these

(iii) The angle of elevation are always

(a) obtuse angle (b) acute angle (c) right angle (d) reflex angle

(iv) If $AB = 10\sqrt{3}\,\text{m}, AD = 2\sqrt{3}\,\text{m},$ then $CD =$

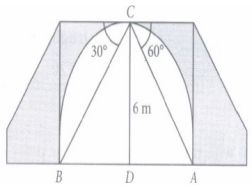


(a) 9 m (b) 11 m (c) 14 m (d) 16 m

(v) If the height of a tree is 6 m, which is broken by wind in such a way that its top touches the ground and makes an angles 30° with the ground. At what height from the bottom of the tree is broken by the wind?

(a) 2 m(b) 4 m(c) 8 m(d) 10 m

367) One day while sitting on the bridge across a river Arun observes the angles of depression of the banks on opposite sides of the river are 30° and 60° respectively as shown in the figure. (Take $\sqrt{3}$ = 1.73)



Based on the above information, answer the following questions.

(i) If the bridge is at a height of 6 m, then AD =

(a) 6 m $(b)\frac{\sqrt{3}}{6}\,\text{m}$ $(c)6\sqrt{3}\,\text{m}$ $(d)\frac{6}{\sqrt{3}}\,\text{m}$

(ii) BD =

(a) 6 m $(b)6\sqrt{3}\,\text{m}$ $(c)\sqrt{3}\,\text{m}$ $(d)10\sqrt{3}\,\text{m}$

(iii) Width of the river is

(a) 10.85 m (b) 13.87 m (c) 15.85 m (d) 19.85 m

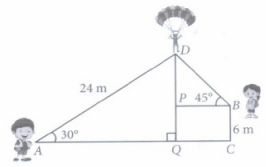
(iv) The angles of elevation and depression are always

(a) acute angles (b) obtuse angles (c) right angles (d) straight angles

(v) If BD = 21 m, then height of the bridge is

(a) 7 m (b) 21 m $(c)7\sqrt{3}\,\text{m}$ $(d)\frac{7}{\sqrt{3}}\,\text{m}$

368) Karan and his sister Riddhima visited at their uncle's place- Bir, Himachal Pradesh. During day time Karan, who is standing on the ground spots a para glider at a distance of 24 m from him at an elevation of 30°. His sister Riddhima is also standing on the roof of a 6 m high building, observes the elevation of the same paraglider as 45°. Karan and Riddhima are on the opposite sides of the paraglider.
Based on the above information, answer the following questions.



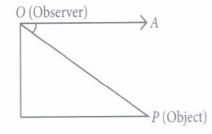
(i) The distance of paraglider from the ground is

(a) 10 m (b) 12 m (c) 18 m (d) 22 m

(ii) The value of PD is

(a) 6 m (b) 7 m (c) 8 m (d) 9 m

(iii) The distance between the paraglider and the Riddhima is

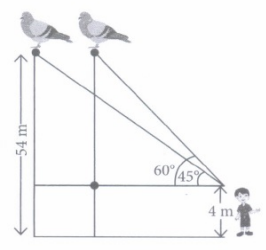


(a) Reflex angle (b) Angle of elevation (c) Straight angle (d) Angle of depression

(v) If A and B are two objects and the eye of an observer is at point 0, then the line of sight will be

(a) OA (b) OB (c) Both (a) and (b) (d) None of these

369) A boy 4 m tall spots a pigeon sitting on the top of a pole of height 54 m from the ground. The angle of elevation of the pigeon from the eyes of boy at any instant is 60°. The pigeon flies away horizontally in such a way that it remained at a constant height from the ground. After 8 seconds, the angle of elevation of the pigeon from the same point is 45°
Based on the above information, answer the following questions. (Take $\sqrt{3}$ = 1.73)



(i) Find the distance of first position of the pigeon from the eyes of the boy.

(a) 54 m (b) 100 m $(c)\frac{100}{\sqrt{3}}$ m $(d)100\sqrt{3}$

(ii) If the distance between the position of pigeon increases, then the angle of elevation

(a) Increases (b) decreases (c) remains unchanged (d) can't say

(iii) Find the distance between the boy and the pole.

(a) 50 m $(b)\frac{50}{\sqrt{3}}$ m $(c)50\sqrt{3}$ m $(d)60\sqrt{3}$ m

(iv) How much distance the pigeon covers in 8 seconds?

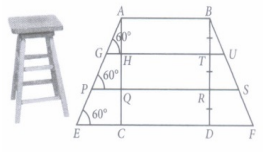
(a) 12.13 m (b) 19.60 m (c) 21.09 m (d) 26.32 m

(v) Find the speed of the pigeon

(a) 2.63 m/sec (b) 3.88 m/sec (c) 6.7 m/sec (d) 9.3 m/sec

370) Aditi purchase a wooden bar stool for her living room with square top of side 2 m and having height of 6 m above the ground. Also each leg is inclined at an angle of 60° to the ground as shown in the figure (not drawn to scale).

Based on the above information, answer the following questions. (Take $\sqrt{3}$ = 1.73)



(i) Find the length of the each leg

(a) 5.9 m (b) 6.93 m (c) 7.3 m (d) 8.2 m

(ii) Find the length of GH.

(a) 0.53 m (b) 1 m (c) 1.15 m (d) 2.73 m

(iii) The length of second step is

(a) 4.3 m (b) 4.99 m (c) 5.68 m (d) 6.78 m

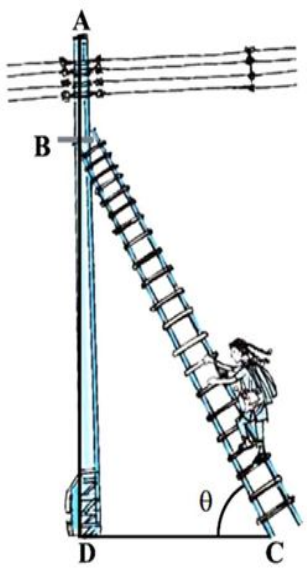
(iv) The length of PQ =

(a) 1.56 m (b) 2.31 m (c) 3.34m (d) 5.68m

(v) The length of first step is

(a) 4.78 m (b) 5.34 m (c) 6.62 m (d) 7.82 m

371) In a village, group of people complained for an electric fault in their area. On their complained, an electrician reached village to repair an electric fault on a pole of height 5 m. She needs to reach a point 1.3m below the top of the pole to undertake the repair work (see the adjoining figure). She used ladder, inclined at an angle of θ to the horizontal such that cos θ = 0.5, to reach the required position



(i) Find the angle of elevation θ

(a) 60^0 (b) 30^0 (c) 45^0 (d) 90^0

(ii) Find the length BD

(a) 3 m (b) 3.5 m (c) 3.7 m (d) 4 m

(iii) Find the length of the ladder (take = $\sqrt{3} = 1.73$)

(a) 4 m (b) 4.3 (c) 4.2 m (d) 4.28 m

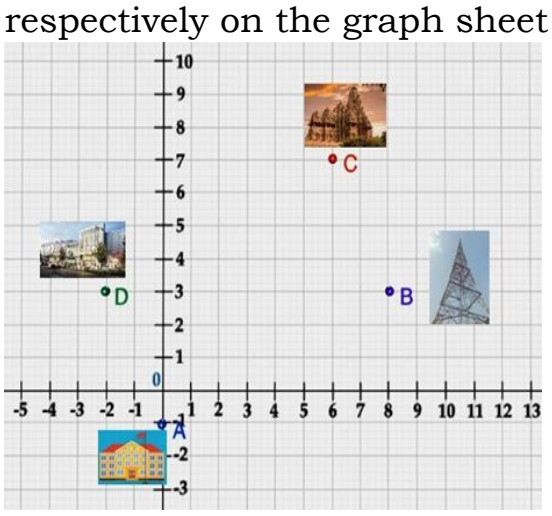
(iv) How far from the foot of the pole should she place the foot of the ladder?

(a) 2 m (b) 2.14 m (c) 2.2 m (d) 2.28 m

(v) If the height of pole and distance BD is doubled, then what will be the length of the ladder

(a) 8 m (b) 8.6 m (c) 8.56 m (d) 8.28m

372) One day Ram went to his home town during Dussehra vacation. During his excursion, he noted the four places Temple, TV tower, Mall and School, then he tried to locate all the places using graph sheet by taking his position at origin. He marked A, B, C and D for School, TV Tower, Temple and Mall respectively on the graph sheet by taking scale as 1 unit = 1 km as shown below.



(i) Find the coordinates of C.

(a) (0, -1) (b) (8, 3) (c) (6, 7) (d) (-2, 3)

(ii) Find the distance between School and TV Tower.

(a) 4 km (b) $4\sqrt{5}$ km **(c)** $2\sqrt{5}$ km **(d)** $3\sqrt{5}$ km

(iii) Find the distance between TV tower and Mall

(a) 8 km (b) 10 km (c) 6 km (d) 9 km

(iv) Find the distance between School and Temple

(a) 8 km (b) 10 km (c) 6 km (d) 9 km

(v) Name the quadrilateral ABCD so formed

(a)	**(b)**	**(c)**	**(d) none of**
Square	**rectangle**	**rhombus**	**these**

373) A group of students of class X visited India Gate on an education trip. The teacher and students had interest in history as well.The teacher narrated that India Gate, official name Delhi Memorial, originally called All India War Memorial, monumental sandstone arch in New Delhi, dedicated to the troops of British India who died in wars fought between 1914 and 1919.The teacher also said that India Gate, which is located at the eastern end of the Rajpath (formerly called the Kingsway), is about 138 ft (42 m) in height.

(i) What is the angle of elevation if they are standing at a distance of 42 m away from the monument?

(a) 30° (b) 45° (c) 60° (d) 0°

(ii) They want to see the tower at an angle of 60°. So, they want to know the distance where they should stand and hence find the distance.

(a) 24.25 m (b) 20.12 m (c) 42 m (d) 24.64 m

(iii) If the altitude of the Sun is at 60°, then the height of the vertical tower that will cast a shadow of length 20 m is

(a) $20\sqrt{3}$ m (b) $\frac{20}{\sqrt{3}}m$ (c) $\frac{15}{\sqrt{3}}m$ (d) $15\sqrt{3}$ m

(iv) The ratio of the length of a rod and its shadow is 1:1. The angle of elevation of the Sun is

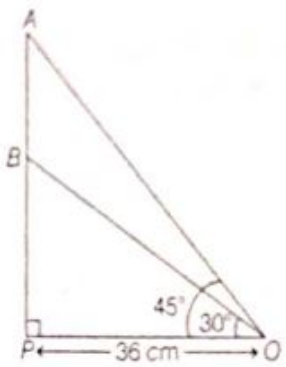
(a) 30° (b) 45° (c) 60° (d) 90°

(v) The angle formed by the line of sight with the horizontal when the object viewed is below the horizontal level is

(a) corresponding angle (b) angle of elevation (c) angle of depression (d) complete angle

374) 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.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 cm. From point O, the angle of elevation of the top of the Section B is 30° and the angle of elevation of the top of Section A is 45°.



Based on the above information, answer the following questions :

(i) Find the length of the wire from the point O be the top of Section B.

(ii) Find the distance AB.

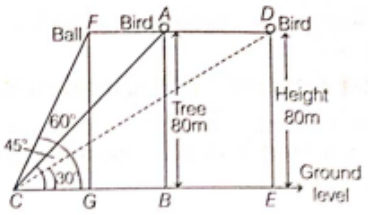
(iii) Find the height of the Section A from the base of the tower.

Or

Find the area of Δ OPB.

375) 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 $2(\sqrt{3} + 1)$ m?

5 Marks 133 x 5 = 665

376) 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^o 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.

377) A contractor plans to install two slides for the children to play in a park. For the children below the age of 5 years, she prefers to have a slide whose top is at a height of 1.5 m, and is inclined at an angle of 30^o to the ground, whereas for elder children, she wants to have a steep slide at a height of 3 m, and inclined at an angle of 60^o to the ground. What should be the length of the slide in each case?

378) The angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of the tower is 30^o . Find the height of the tower.

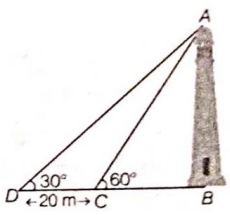
379) A kite is flying at a height of 60 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60^o . Find the length of the string, assuming that there is no slack in the string.

380) A 1.5 m tall boy is standing at some distance from a 30 m tall building. The angle of elevation from his eyes to the top of the building increases from 30° to 60° as he walks towards the building. Find the distance he walked towards the building.

381) 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.

382) 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.

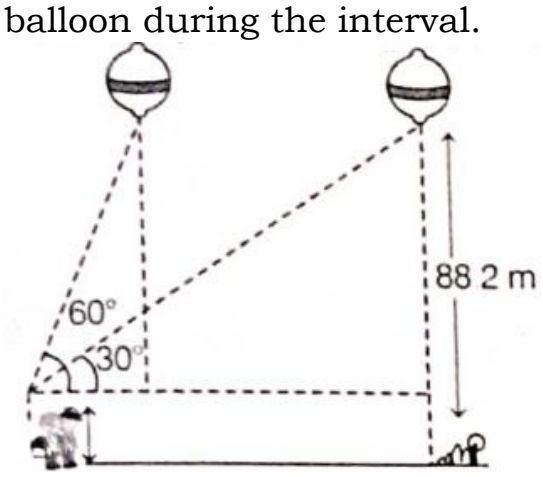
383) A TV tower stands vertically on a bank of a canal. From a point on the other bank directly opposite the tower, the angle of elevation of the top of the tower is 60°. From another point 20 m away from this point on the line joining this point to the foot of the tower, the angle of elevation of the top of the tower is 30° (see the given figure). Find the height of the tower and the width of the canal.



384) 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.

385) As observed from the top of a 75 m high lighthouse 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 lighthouse, find the distance between the two ships.

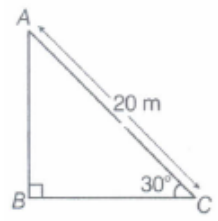
386) A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60°. After sometime, the angle of elevation reduces to 30° (see the figure). Find the distance travelled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



387) 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.

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

389) 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. Find the height of the pole, if the angle made by the rope with ground level is 30° (see figure)

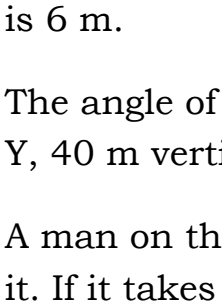


390) The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 50 m high, then find the height of the building.

391) 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 between them on the road, the angles of elevation of the top of the poles are 60° and 30°, respectively. Find the height of the poles and the distances of the point from the poles.

392) A tower stands vertically on the ground. From a point on the ground, which is 15 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60°. Find the height of the tower.

393) An electrician has to repair an electric fault on a pole of height 5 m. She needs to reach a point 1.3m below the top of the pole to undertake the repair work. What should be the length of the ladder that she should use which, when inclined at an angle of 60° to the horizontal, would enable her to reach the required position? Also, how far from the foot of the pole should she place the foot of the ladder? (You may take $\sqrt{3}$ = 1.73)



394) An observer 1.5 m tall is 28.5 m away from a chimney. The angle of elevation of the top of the chimney from her eyes is 45°. What is the height of the chimney?

395) 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 top of the flagstaff from P is 45°. Find the length of the flagstaff and the distance of the building from the point P. (You may take √3 = 1.732)

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

397) From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45°, respectively. If the bridge is at a height of 3 m from the banks, find the width of the river.

398) The angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6 m.

399) The angle of elevation of the top Q of a vertical tower PQ from a point X on the ground is 60^o . At a point Y, 40 m vertically above X, the angle of elevation is 45^o . Find the height of the PQ and the distance XQ.

400) A man on the top of a vertical tower observes a car moving at a uniform speed coming directly towards it. If it takes 12 minutes for the angle of depression to change from 30^o to 45^o how soon after this, will the car reach the tower?

401) A boy standing on a horizontal plane finds a bird flying at a distance of 100 m from him at an elevation of 30^o. A girl standing on the roof of 20 metre high building, finds the angle of elevation of the same bird to be 45^o. Both the boy and the girl are on opposite sides of the bird. Find the distance of bird from the girl. [given $\sqrt{2}$ = 1414]

402) The angle of elevation of a jet fighter from a point A on the ground is 60^o . After a flight of 15 seconds, the angle of elevation changes to 30^o. If the jet is flying at a speed of 720 km/hr, find the constant height. $(\sqrt{3} = 1.732)$

403) From the top of a building 60 m high, the angles of depression of the top and bottom of a vertical lamp post are observed to be 30^o and 60^o respectively. Find
(i) The horizontal distance between the building and the lamp post.
(ii) The height of the lamp post, $\sqrt{3} = 1.732$.

404) The angle of elevation of a cloud from a point 60 m above a lake is 30^o and the angle of depression of the reflection of the cloud in the lake is 60^o . Find the height of the cloud from the surface of the lake.

405) A bird is sitting on the top of a tree, which is 80 m high. The angle of elevation of the bird, from a point on the ground is 45^o . The bird flies away from the point of observation horizontally and remains at a constant height. After 2 seconds, the angle of elevation of the bird from the point of observation becomes 30^o . Find the speed of flying of the bird.

406) At the foot of a mountain, the elevation of its summit is 45º . After ascending 1000 m towards the mountain up a slope of 30º inclination, the elevation is found to be 60º . Find the height of the mountain.

407) 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 30º to 60º . Determine the distance travelled by the ship during the period of observation. $(Use\sqrt{3} = 1.732)$

408) 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.

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

410) From the top of a building 15 m high, the angle of elevation of the top of a tower is found to be 30º . From the bottom of the same building, the angle of elevation of the top of the tower is found to be 45º . Determine the height of the tower and the distance between the tower and the building.

411) A parachutist is descending vertically and makes angles of depression of 45º and 60º at two observation points 100 m apart from each other on the left side of himself. Find, in metres, the approximate height from which he falls and also find, in metres the approximate distance of the point where he falls on the ground from the first observation point.

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

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

414) The length of the shadow of a tower standing on level ground is found to 2 x metre longer when the sun's altitude is 30º than when it was 45º. Prove that the height of tower is $x(\sqrt{3}+1)$ metres.

415) The angle of elevation θ of the top of a lighthouse, as seen by a person on the ground, is such that tan $\theta = \frac{5}{12}$. When the person moves a distance of 240 m towards the lighthouse, the angle of elevation becomes ϕ such that tan $\phi = \frac{3}{4}$. Find the height of the lighthouse.

416) A path separates two walls. A ladder leaning against one wall rests at a point on the path. It reaches a height of 90 m on the wall and makes an angle of 60º with the ground. If while resting at the same point on the path, it were made to lean against the other wall, it would have made an angle of 45º with the ground. Find the height it would have reached on the second wall.

417) The pilot of an aircraft flying horizontally at a speed of 1200 km/hr. observes that the angle of depression of a point on the ground changes from 30º to 45º in 15 seconds. Find the height at which the aircraft is flying.

418) The angle of elevation of a cliff from a fixed point is θ. After going up a distance of k metres towards the top of the cliff at an angle of ϕ, it is found that the angle of elevation is α, Show that the height of the cliff is $\frac{k(cos\phi - sin\phi cot\alpha)}{cot\theta - cot\alpha}$.

419) Two stations due south of a leaning tower which leans towards north are at distances a and b from its foot. If α and β be the elevation of the top of the tower from these stations, prove that its inclination θ to the horizontal is given by $cot\theta = \frac{b \quad cot\alpha - a \quad cot\beta}{b-a}$.

420) If the angle of elevation of a cloud from a point h metres above a lake is α and the angle of depression of its reflection in the lake is β. Prove that the distance of the cloud from the point of observation is $\frac{2hsec\alpha}{tan\beta - tan\alpha}$.

421) From an aeroplane vertically above a straight horizontal plane, the angles of depression of two consecutive kilometre stones on the opposite sided of the aeroplane are found to be α and β, show that the height of the aeroplane is $\frac{tan\alpha tan\beta}{tan\alpha+tan\beta}$.

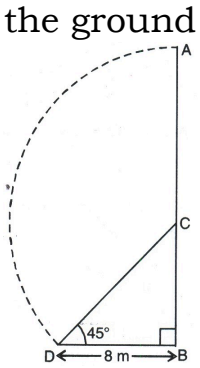
422) From the top of a tower, the angles of depression of two objects on the same side of the tower are found to be α and β ($\alpha > \beta$). If the distance between the objects is 'p' metres, show that the height 'h' of the tower is given by $h = \frac{p \quad tan\alpha \quad tan\beta}{tan\alpha - tan\beta}$. Also determine the height of the tower, if p = 50 m, α = 60°, β =30°.

423) A round balloon of radius 'a' subtends an angle θ at the eye of the observer while the angle of elevation of its centre is ϕ. Prove that the height of the centre of the balloon is a sin ϕ cosec($\theta/2$).

424) A tower subtends an angle α at a point A in the plane of its base and the angle of depression of the foot of the tower at a point b metres just above A is β. Prove that the height of tower is b tan $\alpha \cot \beta$.

425) The lower window of a house is at a height of 2 m above the ground and its upper window is 4 m vertically above the lower window. At certain instant the angles of elevation of a balloon from these windows are observed to be 60° and 30° respectively. Find the height of the balloon above the ground.

426) A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle 45° 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.



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

428) As observed from the top of a 60 m high lighthouse 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 lighthouse, find the distance between the two ships.

429) A vertical tower is surmounted by a flag staff of height 5metres.At a point on the ground, the angles of elevation of bottom and top of flag staff are 45^0 and 60^0 respectively.Find the height of the tower.

430) From top of a 7m high building, the angle of elevation of the top of a cable tower is 60^0 and the angle of depression of its foot is 45°. Determine the height of the tower.

431) If the shadow of a tower 30m long, when the sun's elevation is 30^0.What is the length of the shadow, when sun's elevation is 60^0 ?

432) The length of the shadow of a tower standing on level ground is found to 2x meter longer when the sun,s altitude is 30° than when it was 45°. Prove that the height of tower is ($\sqrt{3}+1$)x metres .

433) The shadow of a tower standing on a level ground is found to be 20m longer when the sun's altitude is 45° than when it is 60° Find the height of the tower.

434) 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.

435) The angle of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are 60° and 30° respectively. Find the height of the tower.

436) A man in a boat rowing away from a lighthouse 100m high, takes 2 minutes to change the angle of elevation of the top of the lighthouse from 60° to 45° .Find the speed of the boat.

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

438) From a window 15 metres high above the ground in a street, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are 30° and 45° respectively show that the height of the opposite house is 23.66 metres. [take,$\sqrt{3}$ = 1.732]

439) The angles of depression of the top and bottom of a 50m high building from the top of a tower are 45^0 and 60^0 respectively.Find the height of the tower and the horizontal distance between the tower and the building.

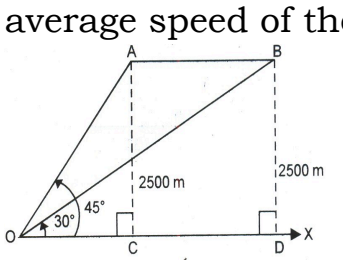
440) The angles of depression of the top and bottom of a tower as seen from the top of a $60\sqrt{3}$ m high cliff are 45° and 60° respectively.Find the height of the tower.

441) Two ships are sailing in the sea on the either side of the lighthouse, the angles of depression of two ships as observed from the top of the lighthouse are 60^o and 45^o respectively.If the distance between the ships is $200\left(\frac{\sqrt{3}+1}{\sqrt{3}}\right)$ metres, find the height of the lighthouse.

442) From an aeroplane vertically above a straight horizontal road, the angles of depression of two consecutive kilometre stone on opposite sides of the aeroplane are observed to be 60^0 and 30^0 show that height (in metres) of aeroplane above the road is $\frac{\sqrt{3}}{4}$ km.

443) A statue, 1.46 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^o and from the same point the angle of elevation of the top of the pedestal is 45^o. Find the height of the pedestal.

444) 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.



445) The angle of elevation of the top of a tower from two distinct points s and t from its foot are complementary.Prove that the height of the tower is $\sqrt{st}$

446) The angle of elevation of the top of a tower from certain point is 30· If the observer moves 20 metres towards the tower, the angle of elevation of the top increases by 15^o. Find the height of the tower.

447) The angle of elevation of the top of a vertical tower from a point on the ground is 60^0.From another point 10m vertically above the first, its angle of elevation is 45^0.Find the height of the tower.

448) The angle of elevation of the top of a tower 30m high from the foot of another tower in the same plane is 60^0 and the angle of elevation of the top of the second tower from the foot of the first tower is 30^0.Find the distance between the two tower and also, the height of the other tower.

449) An electrician has to repair an electric fault on a pole of height 5m.He needs to reach a point 1.3m below the top of the pole to undertake the repair work.What should be the length of the ladder that he should use which, when inclined at an angle of 60^0 to the ground, would enable him to reach the required position?Also, how far from the foot of the pole should he place the foot of the ladder?

450) A tree 12m high, is broken by the wind in such a way that its top touches t ground and makes an angle of 60^0 with the ground.At what hight from the bottom, the tree is broken by the wind?

451) The upper part of a tree broken over by the wind makes an angle of 30^0 with the ground and the horizontal distance from the root of the tree to the point where the top of the tree meets the ground is 25m.Find the height of the tree before it was broken.

452) A tree is broken by the wind.The top struck the ground at an angle of 30^0 and at a distance of 30m from the root.Find the whole height of the tree.

453) The upper part of a tree broken over by the wind makes an angle of 60^0 with ground and distance from the root to the point where the tree touches the ground is 8m; what wAs the height of the tree?

454) A pole being broken by the wind, its top struck the ground at an angle of 30^0, and at a distance of 10m from the foot of the pole.Find the whole height of the pole.

455) From the top of a building 60m high, the angles of depression of the top and bottom of a tower are observed to be 30^0 and 60^0 .Find the height of the tower.

456) The horizontal distance between two towers is 70m.The angles of depression of the top of the first tower when seen the top of the second tower is 120m, find the height of the first tower.

457) From the top of a tower of height 50m, the angle of depression of the top and bottom of a pole are 30^o and 45^o. Find:
(i) how far the pole is from the bottom of the tower?
(ii) the length of the pole. [take, $\sqrt{3}$ = 1732]

458) Two vertical tower are fixed 60m apart.The angle of depression of the top of the first as seen from the top of the second which is 150m high is 30^0 .Find the height of the first pole.

459) The angle of depression of two ships from the top of a lighthouse are 45^0 are 30^0 towards east.If the ships are 200m apart, find the height of the lighthouse.

460) From the top of a hill, the angles of depression of two consecutive kilometre stones due east are found to be 30^0 and 45^0.Find the height of the hill.

461) The shadow of a tower, when the angle of elevation of the sun is 45^0, is found to be 40 40m longer than when it is 60^0.Find the height of the tower.

462) A man standing on the bank of a river observes that the angle of elevation of a tree opposite bank is 60^0.When he moves 50m away from the bank, he find the angle of elevation to be 30^0.Calculate:
(i)the width of the river and
(ii)the height of the tree

463) A helicopter, at an altitude of 1500m, finds that two ships are sailing towards it, in the same direction.The angles of depression of the ships as observed from helicopter are 60^0 and 30^0 respectively.Find the distance between the two ships.

464) At a point on level ground, the angle of elevation of a vertical tower is found to be such that its $\frac{5}{12}$ .On walking 192m towards the tower, the tangent of the angle is found to be $\frac{3}{4}$ .Find the height of the tower.

465) A man on the top of a vertical observation tower observes a car moving at a uniform speed coming directly towards it.If it takes 12minutes for the angle of elevation to change from 30^0 to 45^0, how soon after this will the car reaches the observation tower?

466) A person standing on th ebank of a river observes that the angle of elevation of the top of a tree standing on the opposite bank is 60^0.When he moves 40m away from the bank, he finds the angle of elevation to be 30^0.ind the height of the tree and the width of the river.

467) A man standing on a window of the first floor of a building observes that the angle of depression of a dustbin which is 10m from the foot of the building is 45^o. He climbs to the first floor and observes the angle of depression of the dustbin to be 60^o. Calculate the height of the first floor and the second floor.

468) A pole 5m high is fixed on the top of a tower. The angle of elevation of the top of the pole observed from a point A on the ground is 60^0 and the angle of depression of the point A from the top of the tower is 45^o . Find the height of the tower.

469) An aeroplane when 4500m high passes vertically above of elevation at the same observation point are 60^o and 45^o respectively. How many metres higher is the one than the other?

470) A vertical tower stands on a horizontal plane and is surmounted by a vertical flagstaff of height 5m.At a point on the plane, the flagstaff are respectively 30^o and 60^o.Find the height of the tower.

471) The angle of elevation of the top Q of a vertical tower PQ from a point X on the ground is 60^0.At a point Y, 40m vertically above X, the angle of elevation is 45^0 .Find the tower PQ and the distance XQ.

472) An aeroplane, when 300m high passes vertically above another aeroplane at an instant when the angles of elevation of the two aeroplanes from the same point on the ground are 60^o and 45^o respectively. Find the vertical distance between the two aeroplanes.

473) An observer standing 60m away from a building notices that the angles of elevation of the top and bottom of a flagstaff on the building are respectively 60^o and 45^o.Find the height of the flagstaff.

474) The angle of elevation of the top of a hill at the foot of a tower is 60^o and the angle of elevation of the top of the tower from the foot of the hill is 45^o. If the tower is 75m high, what is the height two trees of the hill?

475) The angle of elevation of the top of a hill at the foot of a tower is 60^o and the angle of elevation of the top of the tower from the foot of the hill is 30^o. If the tower is 50m high, what is the height of the hill?

476) Two posts are 120m apart and the height of one is double that of the other.From the middle point of the line joining their feet, an observer finds that the angular elevation of their tops to be complementary.Find the height of the posts.

477) The horizontal distance between two trees of different height is 60m.The angle of depression of the first tree when seen from the top of the second tree is 45^0 .If the height of the first tree

478) An aeroplane flying horizontally 1km above the ground is observed at an elevation of 60^0.After 10 seconds, its elevation is observed to be 30^0.Find the speed of the aeroplane in km/h.

479) The angle of elevation of a jet plane from a point A on the ground is 60^0.After of 15 seconds, the angle of elevation changes to 30^0.If the jet plane is flying at a constant height of $1500\sqrt{3}$ m.Find the speed of the jet plane.

480) There is a small island in the middle of a 100m wide river and a tall tree stands on the island. P and Q are points directly opposite to each other on two banks and in line with the tree. If the angles of elevation of the top of the tree from p and Q are respectively 30° and 45°
(i) Find the height of the tree. [take, $\sqrt{3}$ = 1732]
(ii) Determine the distance between two trees.
(iii) Which point is farthest from the island?

481) A balloon is connected to an electric pole by a cable of length 215m inclined at 60° to the horizontal. Determine the height of the balloon from the ground. Also, find the height of the balloon, if the angle of inclination is changed from 60° to 30°

482) The angle of elevation of the top of a vertical tower from a point on the ground is 60° . At a point 40m vertically above the first point of observation, the angle of elevation is 30° . Find the height of the tower and the distance between the tower and the first point of observation.

483) Anand is watching a circus artist climbing a 15m long rope, which is tightly stretched and tired from the top of a vertical pole to the ground.
(i) Find the height of the pole, if the angle made by rope with ground level is 45° .
(ii) Which mathematical concept is used to solve this question?
(iii) What value is experienced by Anand?

484) A carpenter makes tools fro electricians with a square top of side 0.5 m and at a height 1.5 m above the ground. Also, each leg is inclined at an angle of 75° to the ground. Find the length of each leg. Also, the lengths two steps to be put at equal distances in metres correct upto two places of decimals.

485) A tree breaks due to storm and the broken part bends so that the top of the touches the ground making an angle 60° with it. The distance between the foot of the tree to the point where the top touches the ground is 10 m. The teacher asked the students to find the height of the tree. All the students failed but Neeraj took initiative and calculated it correctly using trigonometry. (i) What height Neeraj calculated?
(ii) What is quality of Neeraj depicted here?

486) The angles of elevation of the top of a tower from two points distant s and t from its foot are complementary. Prove that the height of the tower is $\sqrt{st}$.

487) A boy whose eye level is 1.3 m from the ground, sports a balloon moving with the wind in a horizontal level at some height from the ground. The angle of elevation of the eyes of the boy at any instant is 60° . After 2 s, the angle of elevation reduces to 30° . If the speed of the wind at that moment is $29\sqrt{3}$ m/s, then find the height of the balloon from ground.

488) A fire in a building B is reported on telephone to two fire stations P and Q, 20 km apart from each other on a straight road. p observes that the fire is at an angle of60° to the road and Q observes that it is an angle of 45° to the road. (i) Which station should send its team and how much will this team have to travel? (ii) What according to you, are the values displayed by the teams at fire stations P and Q.

489) The elevation of a hill from a point P due East of it is θ and at a place Q due South of P, the elevation is ϕ . If the distance PQ be d, then find the height of the hill.

490) If $300\sqrt{3}$ m high tower makes angle of elevation at a point on ground which is 300 m away from its foot, then find the angle of elevation.

491) A bridge on a river makes an angle of 45° with its edge. If the length along the bridge from one edge to the other is 150 m, then find the width of the river.