



Assignment – 2

Subject: Mathematics

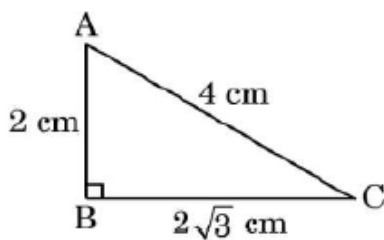
Class: X

JULY' 2026

Chapter: Some Applications Of Trigonometry

Q1.

In the given figure, the angle of elevation of point A from point C is :



- | | |
|----------------|--------------------------|
| (A) 30° | (B) 45° |
| (C) 60° | (D) Cannot be determined |

Q2.

Two ships are sailing in the sea on either side of a lighthouse. The angles of depression to the two ships as observed from the top of the lighthouse are 60° and 45° , respectively. If the distance between the ships is $100 \left(\frac{1 + \sqrt{3}}{\sqrt{3}} \right)$ m, then find the height of the lighthouse.

Q3.

The angles of depression of the top and the bottom of an 8 m tall building from the top of another multistoried building are 30° and 45° , respectively. Find the height of the multistoried building and the distance between the two buildings.

Q4. At a given instance, Air Traffic Control finds that the angle of elevation of an airplane from a point on the ground is 60° . After a flight of 30 seconds, it is observed that the angle of elevation changes to 30° . The height of the plane remains constantly as $3000\sqrt{3}$ m.

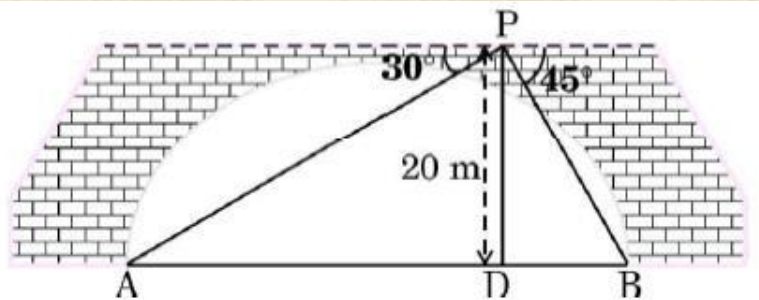
Use the above information to answer the questions that follow-

- (i) Draw a neat labelled figure to show the above situation diagrammatically.
- (ii) What is the distance travelled by the plane in 30 seconds?
- (iii) Keeping the height constant, during the above flight, it was observed that after $15(\sqrt{3} - 1)$ seconds, the angle of elevation changed to 45° . How much is the distance travelled in that duration.
- (iv) What is the speed of the plane in km/hr.

Q5.

Case Study - 1

Two motorboats A and B are waiting at the opposite banks of a river in order to reach the opposite side. From a point P on the bridge, 20 m above the river, the angles of depression of the boats are 30° and 45° respectively, as shown in the figure given below. Both the boats leave at the same time at the speed of 10 m/s and 5 m/s, respectively



Based on the above information, answer the following questions :

- (i) Find the distance travelled by boat A to reach point D in the river, vertically below the point P. (Use $\sqrt{3} = 1.73$) 1
- (ii) What is the width of the river ? 1
- (iii) (a) Which boat will reach point D first, and how much earlier, than the other boat ? 2

OR

- (b) What is the distance between the two boats after 3 seconds ? 2

Q6. CASE STUDY - 2

Clinometer is a tool that is used to measure the angle of elevation. We can use the clinometer to measure the height of tall things that you can't possibly reach. With the help of a clinometer, Harish measured the angle of elevation of the roof of a building from a point P on the ground as 45° . On the same wall, at some height below the top, there was a society logo, whose angle of elevation from the same point P was measured as 30° . The point P is at a distance of 24 m from the base of the building. Based on the above information, answer the following questions :

(a) (i) What is the height of the building logo from the ground ?

OR

(ii) What is the height of the building from the ground ?

(b) What is the aerial (slant) distance of point P from the top of the building ?

(c) If θ is the angle of elevation of the top of building when the point P is moved 9 m towards the base of the building, then, find $\tan \theta$.

CHAPTER : Arithmetic Progressions

Q1.

If the first term of an A.P. is -12 and the common difference is 4, then the sum of its first 7 terms is

- | | |
|-----------|-----------|
| (A) -24 | (B) -48 |
| (C) 0 | (D) 48 |

Q2.

The 9^{th} term from the end (towards first term) of the AP 7, 11, 15, 19, ..., 147 is :

- | | |
|---------|---------|
| (A) 135 | (B) 125 |
| (C) 115 | (D) 39 |

Q3.

If the sum of first m terms of an AP is $2m^2 + 3m$, then its second term is :

- (A) 10
- (B) 9
- (C) 12
- (D) 4

Q4. **DIRECTION:** In the question number 4, a statement of **Assertion(A)** is followed by a statement of **Reason(R)**. Choose the correct option.

- (a) Both Assertion and Reason are true and Reason is a correct explanation of Assertion.
- (b) Both Assertion and Reason are true but Reason is not a correct explanation of Assertion.
- (c) Assertion is true and Reason is false
- (d) Assertion is false and Reason is true.

Assertion (A) : Common difference of the AP : 5, 1, - 3, - 7, ... is 4.

Reason (R): Common difference of the AP : $a_1, a_2, a_3, \dots, a_n$ is obtained by $d = a_n - a_{n-1}$.

Q5.

Find the sum of first 20 terms of an A.P. whose n^{th} term is given by $a_n = 5 + 2n$. Can 52 be a term of this A.P. ?

Q6.

The sum of the third term and the seventh term of an AP is 6 and their product is 8. Find the sum of the first sixteen terms of the AP.

Q7.

An AP consists of 'n' terms whose n^{th} term is 4 and the common difference is 2. If the sum of 'n' terms of AP is -14, then find 'n'. Also, find the sum of the first 20 terms.

Q8.

The sum of the first six terms of an arithmetic progression is 42. The ratio of the 10^{th} term to the 30^{th} term is 1 : 3. Calculate the first and the thirteenth terms of the AP.

Q9.

Case Study – 1

A school is organizing a charity run to raise funds for a local hospital. The run is planned as a series of rounds around a track, with each round being 300 metres. To make the event more challenging and engaging, the organizers decide to increase the distance of each subsequent round by 50 metres. For example, the second round will be 350 metres, the third round will be 400 metres and so on. The total number of rounds planned is 10.



Based on the information given above, answer the following questions :

- (i) Write the fourth, fifth and sixth term of the Arithmetic Progression so formed.
- (ii) Determine the distance of the 8th round.
- (iii) (a) Find the total distance run after completing all 10 rounds.

OR

- (iii) (b) If a runner completes only the first 6 rounds, what is the total distance run by the runner ?

Q10.

The school auditorium was to be constructed to accommodate at least 1500 people. The chairs are to be placed in concentric circular arrangement in such a way that each succeeding circular row has 10 seats more than the previous one.



- (i) If the first circular row has 30 seats, how many seats will be there in the 10th row?
- (ii) For 1500 seats in the auditorium, how many rows need to be there?

OR

If 1500 seats are to be arranged in the auditorium, how many seats are still left to be put after 10th row?

- (iii) If there were 17 rows in the auditorium, how many seats will be there in the middle row?

CHAPTER : Probability

Q1.

The probability that a 2– digit number less than 20, selected at random will be a multiple of 2 and not a multiple of 3, is

- (A) $\frac{1}{2}$
- (B) $\frac{1}{5}$
- (C) $\frac{3}{10}$
- (D) $\frac{3}{11}$

Q2.

A black card is lost from a deck of 52 playing cards. Rest of the cards are shuffled and one card is drawn at random from the available cards. The probability that drawn card is 'king of hearts', is

(A) $\frac{1}{52}$

(B) $\frac{1}{4}$

(C) $\frac{1}{51}$

(D) $\frac{1}{26}$

Q3.

The probability of guessing the correct answer of a certain test question is $\frac{x}{12}$. If the probability of not guessing the correct answer is $\frac{5}{6}$, then find the value of x.

Q4.

Two dice are rolled together. The probability that only one die shows number 4, is

(A) $\frac{11}{36}$

(B) $\frac{1}{3}$

(C) $\frac{5}{18}$

(D) $\frac{1}{4}$

Q5.

To inculcate the good habit of savings in her children, Reema brought a piggy bank and after putting a ₹ 10 coin in it, she handed it over to her daughter Amisha and asked as to put money in it from her pocket money at the beginning of every week. Amisha put two ten rupee coins at the beginning of next (second) week and in this way increases her savings by one ₹ 10 coin every week.

Based on the above, answer the following questions :

- (a) How many coins were added in the piggy bank at the beginning of 5th week ?
- (b) How many ₹ 10 coins will be there in the piggy bank after the end of 7 weeks ?
- (c) (i) If the piggy bank can hold a maximum of 300 ₹ 10 coins, after how many weeks it would be full ?

OR

- (c) (ii) Find the total amount of money in the piggy bank at the end of 20 weeks.

Q6. Three unbiased coins are tossed simultaneously. Find the probability of getting:

- (a) exactly two heads
- (b) at least one tail
- (c) at most two tails

Q7. A card is selected from a deck of 52 cards. The probability of being a red face card is

- (a) $\frac{3}{26}$
- (b) $\frac{3}{13}$
- (c) $\frac{2}{13}$
- (d) $\frac{1}{2}$

Q8. A ticket is drawn at random from a bag containing tickets numbered from 1 to 40. The probability that the selected ticket has a number which is a multiple of 5 is

- (a) $\frac{1}{5}$
- (b) $\frac{3}{5}$
- (c) $\frac{4}{5}$
- (d) 1

Q9. Peter throws two different dice together and finds the product of two numbers obtained.

Reena throws a die and squares the number obtained. Who has the better chance to get the number 25?

Q10. A bag contains cards numbered from 25 to 95. A card is drawn from the bag. Find the probability that the number on the drawn card is

- (i) divisible by 3 or 5.
- (ii) a perfect square number
- (iii) a two digit number.