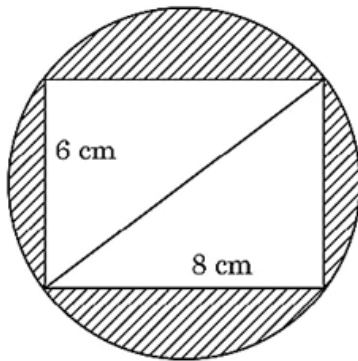


24. In a $\triangle ABC$ right angled at B, if $AB = 4$ and $BC = 3$, find all the six trigonometric ratios of $\angle A$ [2]

OR

Prove the trigonometric identity: $\frac{1-\sin\theta}{1+\sin\theta} = (\sec\theta - \tan\theta)^2$

25. Reeti prepares a Rakhi for her brother Ronit. The Rakhi consists of a rectangle of length 8 cm and breadth 6 cm [2]
inscribed in a circle as shown in the figure. Find the area of the shaded region. (Use $\pi = 3.14$)



Section C

26. Amita, Suneha and Raghav start preparing cards for greeting each person of an old age home on new year. In order to complete one card, they take 10, 16 and 20 minutes respectively. If all of them started together, after what time will they start preparing a new card together? Why do you think there is a need to show elders that the young generation cares for them and remembers the contribution made by them in the prime of their life? [3]
27. Find the zeros of polynomial $p(y) = y^2 + \frac{3\sqrt{5}}{2}y - 5$ and verify the relationship between the zeros and its coefficients. [3]
28. The following distribution gives the number of accidents met by 160 workers in a factory during a month. [3]

No. of accidents (x)	0	1	2	3	4
No. of workers (f)	70	52	34	3	1

Find the average number of accident per worker.

29. If the numerator of a fraction is multiplied by 2 and the denominator is reduced by 5 the fraction becomes $\frac{6}{5}$. [3]
And, if the denominator is doubled and the numerator is increased by 8, the fraction becomes $\frac{2}{5}$. Find the fraction.

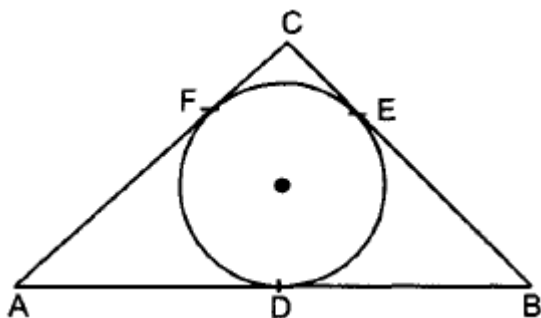
OR

A two-digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number.

30. If $\sin\theta + \sin^2\theta + \sin^3\theta = 1$, then prove that $\cos^6\theta - 4\cos^4\theta + 8\cos^2\theta = 4$ [3]
31. If radii of the two circles are equal, prove that $AB = CD$ where AB and CD are common tangents. [3]

OR

In figure, a circle inscribed in triangle ABC touches its sides AB , BC and AC at points D , E and F respectively. If $AB = 12$ cm, $BC = 8$ cm and $AC = 10$ cm, then find the lengths of AD , BE and CF .



Section D

32. Find the mean, median and mode of the following frequency distribution table: [5]

Marks	0-10	10-20	20-30	30-40	40-50	Total
Number of students	8	16	36	34	6	100

33. Sides AB and AC and median AM of a $\triangle ABC$ are proportional to sides DE and DF and Median DN of another $\triangle DEF$. Show that $\triangle ABC \sim \triangle DEF$. [5]

34. The sum of two numbers is 34. If 3 is subtracted from one number and 2 is added to another, the product of these two numbers becomes 260. Find the numbers. [5]

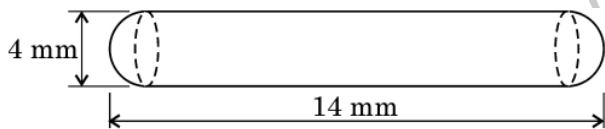
OR

If the roots of the quadratic equation $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$ in x are equal then show that either $a = 0$ or $a^3 + b^3 + c^3 = 3abc$

35. A solid iron pole consists of a solid cylinder of height 200 cm and base diameter 28 cm, which is surmounted by another cylinder of height 50 cm and radius 7 cm. Find the mass of the pole, given that 1 cm^3 of iron has approximately 8 g mass. [5]

OR

A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends. The length of the entire capsule is 14 mm and the diameter of the capsule is 4 mm, find its surface area. Also, find its volume.



Section E

36. Read the following text carefully and answer the questions that follow: [4]

Kamla and her husband were working in a factory in Seelampur, New Delhi. During the pandemic, they were asked to leave the job. As they have very limited resources to survive in a metro city, they decided to go back to their hometown in Himachal Pradesh. After a few months of struggle, they thought to grow roses in their fields and sell them to local vendors as roses have been always in demand. Their business started growing up and they hired many workers to manage their garden and do packaging of the flowers.



In their garden bed, there are 23 rose plants in the first row, 21 are in the 2nd, 19 in 3rd row and so on. There are 5 plants in the last row.

- How many rows are there of rose plants? (1)
- Also, find the total number of rose plants in the garden. (1)
- How many plants are there in 6th row. (2)

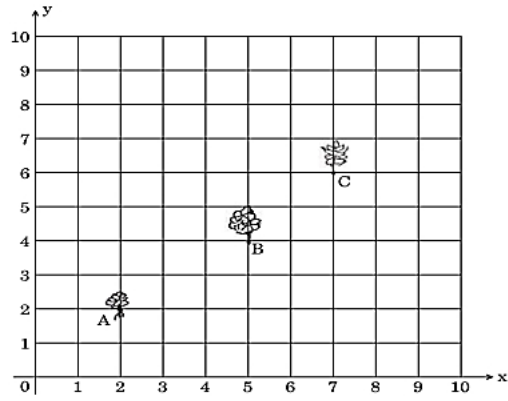
OR

If total number of plants are 80 in the garden, then find number of rows? (2)

37. Read the following text carefully and answer the questions that follow: [4]

Reena has a $10 \text{ m} \times 10 \text{ m}$ kitchen garden attached to her kitchen. She divides it into a 10×10 grid and wants to grow some vegetables and herbs used in the kitchen. She puts some soil and manure in that and sow a green chilly plant at A, a coriander plant at B and a tomato plant at C. Her friend Kavita visited the garden and praised

the plants grown there. She pointed out that they seem to be in a straight line. See the below diagram carefully:



- i. Find the distance between A and B? (1)
- ii. Find the mid-point of the distance AB? (1)
- iii. Find the distance between B and C? (2)

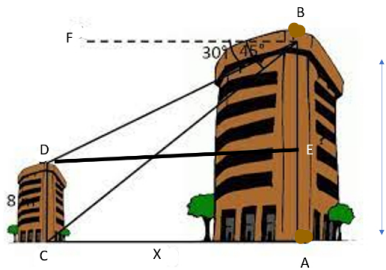
OR

Find the mid point of BC. (2)

38. **Read the following text carefully and answer the questions that follow:**

[4]

Basant and Vinod lives in a housing society in Dwarka, New Delhi. There are two building in their housing society. The first building is 8 meter tall. One day, both of them were just trying to guess the height of the other multi-storeyed building. Vinod said that it might be a 45 degree angle from the bottom of our building to the top of multi-storeyed building so the height of the building and distance from our building to this multi-storeyed building will be same. Then, both of them decided to estimate it using some trigonometric tools. Let's assume that the first angles of depression of the top and bottom of an 8 m tall building from top of a multi-storeyed building are 30° and 45° , respectively.



- i. Now help Vinod and Basant to find the height of the multistoried building. (1)
- ii. Also, find the distance between two buildings. (1)
- iii. Find the distance between top of multistoried building and bottom of first building. (2)

OR

Find the distance between top of multistoried building and top of first building. (2)