

FIRST TERM EXAMINATION—2024-25

CLASS-X

SUBJECT—MATHEMATICS

Time : 3 Hrs.

M.M. : 80

GENERAL INSTRUCTIONS:

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required.

SECTION – A

Section A consists of 20 questions of 1 mark each.

1. LCM of the numbers 'x' and 'y' where y is a multiple of 'x' is given by

a) X

b) y

~~c) xy~~

d) x+y

(1)

2. The values of p and q such that the prime factorisation of 2520 is expressible as $2^3 \times 3^p \times q \times 7$ respectively are

a) 2, 3

b) 3, 5

~~c) 2, 5~~

d) 5, 7

(1)

3. If the sum of the zeroes of the quadratic polynomial $3x^2 - kx + 6$ is 3, the value of k is

a) 3

b) 1

~~c) 9~~

d) -9

(1)

11. One equation of a pair of dependent linear equations is $-5x + 7y - 2 = 0$. The second equation can be

a) $10x + 14y + 4 = 0$

b) $-10x - 14y + 4 = 0$

c) $-10x + 14y + 4 = 0$

d) $10x - 14y + 4 = 0$ (1)

12. Find the value of $(1 + \tan^2 q)(1 - \sin q)(1 + \sin q)$

a) 0

b) 1

c) 2

d) None of these (1)

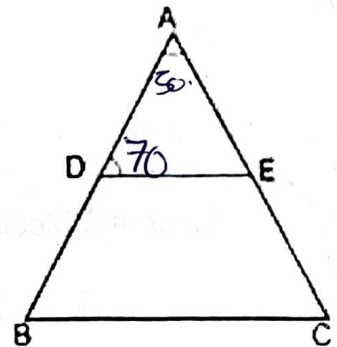
13. In the figure shown along side, $DE \parallel BC$, $\angle ADE = 70^\circ$ and $\angle BAC = 50^\circ$, then find $\angle BCA$.

a) 30°

b) 60°

c) 40°

d) 45° (1)



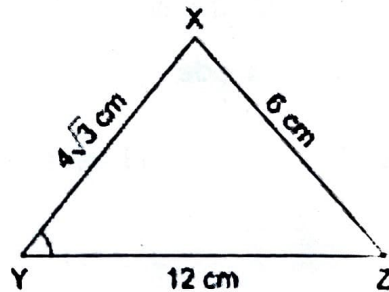
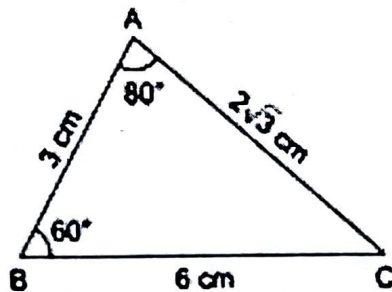
14. In the given figure, $\triangle ABC$ and $\triangle XYZ$ are shown. If $AB = 3$ cm, $BC = 6$ cm, $AC = 2\sqrt{3}$ cm, $\angle A = 80^\circ$, $\angle B = 60^\circ$, $XY = 4\sqrt{3}$ cm, $YZ = 12$ cm and $XZ = 6$ cm, then the value of $\angle Y$ is:

a) 10°

b) 40°

c) 35°

d) 75° (1)



15. Consider the data:

Class	65-85	85-105	105-125	125-145	145-165	165-185	185-205
Frequency	4	5	13	20	14	7	4

The difference of the upper limit of the median class and the lower limit to the modal class is :

- a) 0
 - b) 19
 - c) 20
 - d) 38
- (1)

16. The points on x-axis at a distance of 10 units from $(11, -8)$ are
- a) $(5, 2), (17, 0)$
 - b) $(5, 0), (17, 0)$
 - c) $(6, 0), (17, 0)$
 - d) $(5, 0), (16, 0)$
- (1)

17. If $\sin \alpha = \frac{\sqrt{3}}{2}$ and $\cos \beta = \frac{1}{2}$, then the value of $(\alpha - \beta)$ is
- a) 0°
 - b) 30°
 - c) 60°
 - d) 90°
- (1)

18. For a frequency distribution, mean, median and mode are connected by the relationship
- a) $2 \text{ Mean} = 3 \text{ Median} - \text{Mode}$
 - b) $2 \text{ Mode} = \text{Median} - \text{Mean}$
 - c) $\text{Mode} = 2 \text{ Mean} - 3 \text{ Median}$
 - d) $3 \text{ Median} = 2 \text{ Mode} + \text{Mean}$
- (1)

19. DIRECTION: In question number 19 and 20, a statement of assertion (A) is followed by a Statement of Reason (R). Choose the correct option.

Statement A (Assertion): D and E are points on the side AB and AC respectively of $\triangle ABC$ such that $AD = 4 \text{ cm}$, $DB = 6 \text{ cm}$, $AE = 9 \text{ cm}$ and $EC = 15 \text{ cm}$, then DE is parallel to BC

Statement R (Reason): If a line divides any two sides of a triangle in the same ratio then it is parallel to the third side.

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

SECTION - C

Section C has 6 questions carrying 3 marks each.

Qx6

26. An army contingent of 612 members is to march behind an army band of 48 members in a parade. The two are to march in the same number of columns. What is the maximum number of columns in which they can march? (3)
27. Find the zeros of the polynomial $p(x) = 4\sqrt{3}x^2 + 5x - 2\sqrt{3}$ and verify the relationship between the zeroes and its coefficients. (3)
28. Find the ratio in which the point $(-3, p)$ divides the line-segment joining the points $(-5, -4)$ and $(-2, 3)$. Also find the value of p . *ratio 2:1* $p = \frac{2}{3}$ (3)
29. If the equation $(1 + m^2)x^2 + 2mcx + (c^2 - a^2) = 0$ has equal roots, prove that $c^2 = a^2(1 + m^2)$ (3)

OR

The sum of a two-digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, find the number. How many such numbers are there?

30. Find the mode of the following distribution : (3)

Class	0-20	20-40	40-60	60-80	80-100	100-120	120-140
Frequency	12	18	15	25	26	15	9

OR

The Government rescued 100 people after a train accident. Their ages were recorded in the following table. Find their mean age.

Age (in years)	Number of people rescued
10 - 20	9
20 - 30	14
30 - 40	15
40 - 50	21
50 - 60	23
60 - 70	12
70 - 80	6

Statement A (Assertion): The points A (-1, 0), B (3, 1), C (2, 2) and D (-2, 1) are the vertices of a parallelogram.

Reason (R): Diagonals of a parallelogram bisect each other.

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

SECTION - B

Section B has 5 questions carrying 02 marks each.

21. If α and β are the zeros of the polynomial $p(x) = 3x^2 - 2x - 1$, without finding the actual value of α and β evaluate $(1 - \alpha)(1 - \beta)$.

OR

Find the value of "p" from the polynomial $x^2 + 3x + p$, if one of the zeroes of the polynomial is 2. (2)

22. Prove that $\sqrt{3} + 5$ is irrational, given that $\sqrt{3}$ is irrational. (2)

23. In an A.P. the 6th term is (-10) and the 10th term is (-26). Determine the 15th term of the A.P.

OR

Anirban started a work in 2023 at an annual salary of ₹5000 and received an increment of ₹200 each year. In which year, did his income reach ₹7000? 2

24. E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\Delta ABE \sim \Delta CFB$. (2)

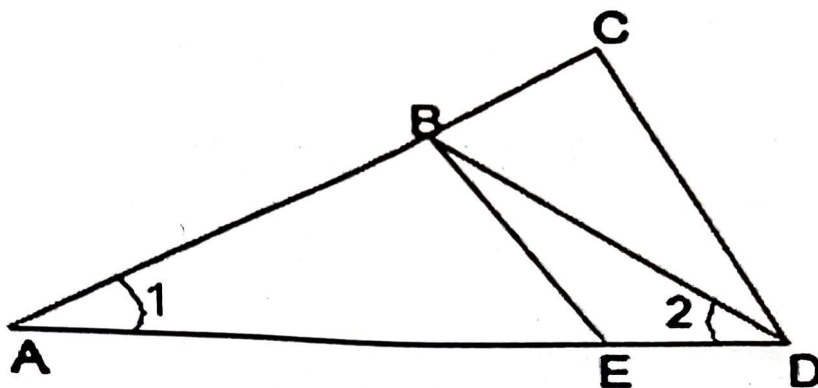
25. If $\tan A = 2$, prove that (2)

$$\frac{4 \sin A - \cos A}{2 \sin A + \cos A} = \frac{7}{5}$$

31. In the given figure below,

(3)

$\frac{AD}{AE} = \frac{AC}{BD}$ and $\angle 1 = \angle 2$ show that $\triangle BAE \sim \triangle CAD$.



SECTION - D

Section D consists of 4 questions carrying 5 marks each

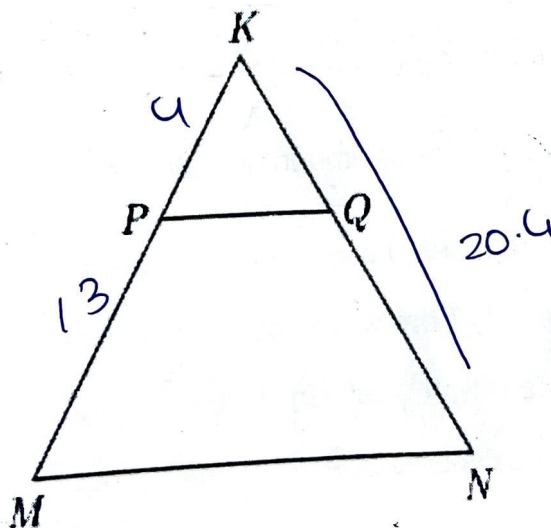
32. There are 25 trees at equal distances of 5m in a line with a well, the distance of the well from the nearest tree being 10m. A gardener waters all the trees separately starting from the well and he returns to the well after watering each tree to get water for the next. Find the total distance the gardener will cover in order to water all the trees. (5)

33. Sides AB and BC and median AD of a $\triangle ABC$ are respectively proportional to sides PQ and QR and median PM of $\triangle PQR$. Show that $\triangle ABC \sim \triangle PQR$. (5)

OR

i) Prove that if a line is drawn parallel to one side of a triangle intersecting the other two sides in distinct points, then the other two sides are divided in the same ratio.

ii) In the given figure, PQ is parallel to MN. If $\frac{KP}{PM} = \frac{4}{13}$ and $KN = 20.4$ cm then find KQ.



34

Half

Find the missing frequencies in the following frequency distribution table, if the total frequency is 100 and median is 32. (5)

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of Students	10	x	25	30	y	10

35.

Prove that $\frac{\cos A}{1 + \sin A} + \frac{1 + \sin A}{\cos A} = 2 \sec A$

OR

Prove that $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \cdot \operatorname{cosec} \theta$

SECTION - E

Section E has 3 questions carrying 4 marks each.

36. Two schools 'P' and 'Q' decided to award prizes to their students for two games of Hockey ₹x per student and Cricket ₹y per student. School 'P' decided to award a total of ₹9500 for the two games to 5 and 4 students respectively; while school 'Q' decided to award ₹7370 for the two games to 4 and 3 students respectively.

5x + 4y = 9500

4x + 3y = 7370

Based on the above information, answer the questions given below.

i) Represent the given information algebraically (in terms of x and y). (1)

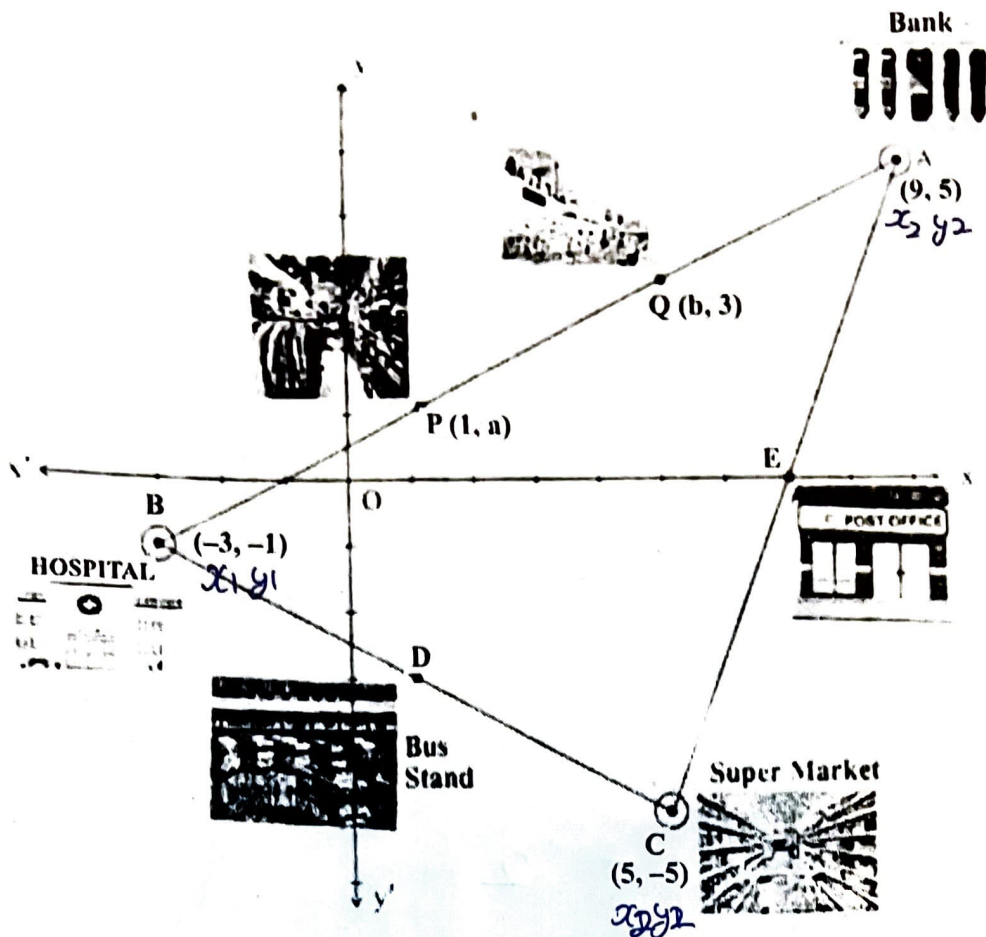
ii) What is the prize amount for hockey? ₹1150 (2)

OR

ii) Prize amount on which game is more and by how much?

iii) What will be the total prize amount if there are 2 students each from two games? (1)

37. Partha, a software engineer, lives in Jerusalem for his work. He lives in the most convenient area of the city from where bank, hospital, post office and supermarket can be easily accessed. In the graph, the bank is plotted as A (9, 5), hospital as B (-3, -1) and supermarket as C (5, -5) such that A, B, C form a triangle.



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

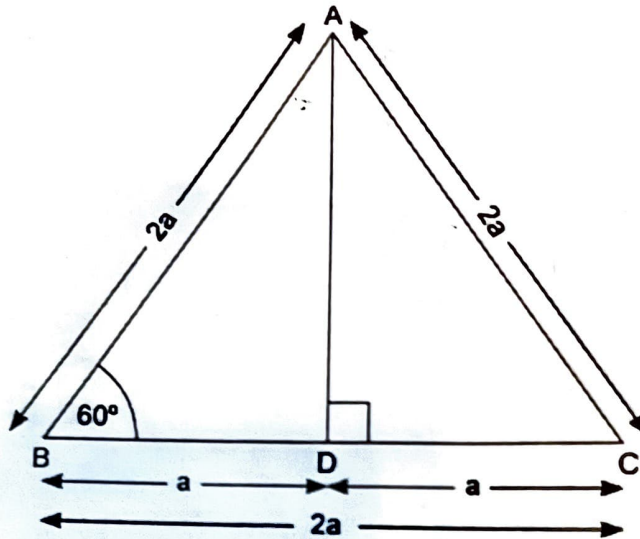
- ~~i)~~ Find the distance between the bank and the hospital. $\sqrt{180}$ (1)
- ~~ii)~~ In between the bank and the supermarket, there is a post office plotted at E which is their mid-point. Find the coordinates of E. $(7, 0)$ (1)
- ~~iii)~~ ~~a)~~ In between the hospital and the supermarket, there is a bus stop plotted as D, which is their mid-point. If Partha wants to reach the bus stand from the bank, then how much distance does he need to cover? $\sqrt{180} + \sqrt{40}$ (2)

$$= \sqrt{220}$$

OR

- ~~b)~~ P and Q are two different garment shops lying between the bank and the hospital, such that $BP = PQ = QA$. If the coordinates of P and Q are $(1, a)$ and $(b, 3)$ respectively, then find the values of 'a' and 'b'.

Some students of class-X of a school were asked to show trigonometric ratio of 60° on the top of the table using some sticks. The students were excited to do this case. So, they took 4 sticks. Three of them were equal and the 4th stick was smaller than the three. They put the sticks as shown in the given figure $\triangle ABC$ and height AD .



i) What is the length of AD and measure of $\angle BAD$.

ii) Find the value of $\operatorname{Cosec} 30^\circ = 2$

iii) Find the value of $\frac{1 + \cos B}{\sin B}$ when angle $B = 60^\circ$

$$\frac{1+2}{\frac{\sqrt{3}}{2}} = \frac{3}{\frac{\sqrt{3}}{2}} = \frac{3}{\sqrt{3}} \times 2 = \frac{6}{\sqrt{3}} = 2\sqrt{3}$$

OR

Find the value of

$\frac{1 + \tan^2 B}{1 + \cot^2 B}$ when angle $B = 60^\circ$

3 As

-x-x-