Sample Paper 23

Class - 10th Exam - 2026 - 27

Mathematics - Basic

Time : 3 Hours **Max. Marks : 80**

General Instructions :

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion - Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Question of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take $\pi = \frac{22}{7}$ wherever required if not stated.
11. Use of calculators is not allowed.

SECTION - A

Section A consists of 20 questions of 1 mark each.

1. If α and β are the roots of $ax^2 - bx + c = 0 (a \neq 0)$, then value of $\alpha + \beta$ is

(a) $\frac{b}{a}$ (b) $\frac{a}{b}$

(c) $\frac{2a}{b}$ (d) $\frac{a}{2b}$

2. What are the values of x and y for the following pair of linear equations ?

$99x + 101y = 499$ and $101x + 99y = 501$

(a) 3 and 6 (b) 3 and 2

(c) 2 and 3 (d) 6 and 3

3. The zeroes of polynomial $p(x) = ax^2 + bx + c$ are reciprocal of each other if

(a) $b = 2a$ (b) $c = b$

(c) $b = a$ (d) $c = a$

4. If -1 is a zero of the polynomial $p(x) = kx^2 - 4x + k$, the value of k is

(a) –4 (b) –2

(c) 2 (d) 4

5. If a number x is chosen at random from the numbers $-3, -2, -1. 0, 1, 2, 3$, then What is the probability of $x^2 < 4$?

(a) $\frac{4}{7}$ (b) $\frac{3}{7}$

(c) $\frac{1}{7}$ (d) $\frac{2}{7}$

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

(a) 10 m (b) 14 m

(c) 8 m (d) 15 m

7. The famous mathematician associated with finding the sum of the first 100 natural numbers is

(a) Pythagoras (b) Newton

(c) Gauss (d) Euclid

8. The value of x for which $2x,(x+10)$ and $(3x+2)$ are the three consecutive terms of an AP, is

(a) 6 (b) -6

(c) 18 (d) -18

9. If x_i's are the mid-points of the class intervals of grouped data, f_i's are the corresponding frequencies and $\overline{x}$ is the mean, then $\sum(f_i x_i - \overline{x})$ is equal to

(a) 0 (b) -1

(c) 1 (d) 2

10. Which of the following value of k should be selected so that the pair of equations $x+2y=5$ and $3x+ky+15=0$ has a unique solution ?

(a) $k \neq 5$ (b) $k \neq 6$

(c) $k=5$ (d) $k=6$

11. The quadratic equation $x^2+3x+2\sqrt{2}=0$ has

(a) Two distinct real roots (b) Two equal real roots

(c) No real roots (d) More than 2 real roots

12. A ladder 10 m long reaches a window 8 m above the ground. The distance of the foot of the ladder from the base of the wall is ..... m.

(a) 8 m (b) 2 m

(c) 6 m (d) 4 m

13. If points $A(-3,12)$, $B(7,6)$ and $C(x,9)$ are collinear, then the value of x is ..... .

(a) 2 (b) 3

(c) 4 (d) 5

14. If the sum of the circumferences of two circles with radii R_1 and R_2 is equal to the circumference of a circle of radius R, then

(a) $R_1+R_2=R$ (b) $R_1+R_2>R$

(c) $R_1+R_2>R$ (d) $R_1+R_2<R$

15. The value of $\sin^2 41^\circ + \sin^2 49^\circ$ will be

(a) 1 (b) $\sqrt{2}$

(c) 2 (d) $\sqrt{3}$

Continue on next page.....

16. The number $\frac{7}{75}$ will have -

(a) Non-terminating repeating decimal expansion.

(b) Terminating decimal expansion.

(c) Non-terminating non repeating decimal expansion.

(d) Terminating non repeating decimal expansion

17. If the perimeter of one face of a cube is 20 cm, then its surface area is

(a) $120\,\text{cm}^2$ (b) $150\,\text{cm}^2$

(c) $125\,\text{cm}^2$ (d) $400\,\text{cm}^2$

18. $\sin^2 60^\circ - 2\tan 45^\circ - \cos^2 30^\circ = ?$

(a) 2 (b) –2

(c) 1 (d) –1

19. **Assertion :** The two tangents are drawn to a circle from an external point, then they subtend equal angles at the centre.

Reason : A parallelogram circumscribing a circle is a rhombus.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

20. **Assertion :** The values of x are $-\frac{a}{2}, a$ for a quadratic equation $2x^2 + ax - a^2 = 0$.

Reason : For quadratic equation $ax^2 + bx + c = 0$ $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

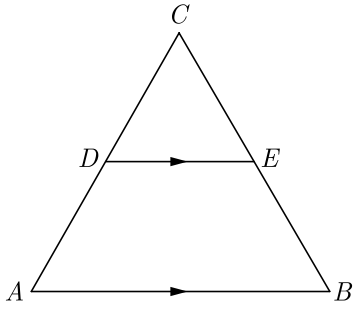
SECTION - B

Section B consists of 5 questions of 2 marks each.

21. Find the value of $\cos 2\theta$, if $2\sin 2\theta = \sqrt{3}$.

Continue on next page.....

22. In the given figure, $\angle A = \angle B$ and $AD = BE$. Show that $DE \,||\, AB$.



23. A lot consists of 144 ball pens of which 20 are defective and others are good. Nuri will buy a pen if it is good, but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the probability that :

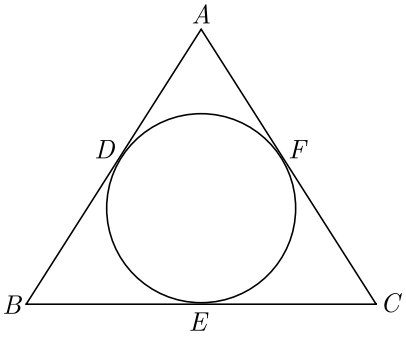
(i) she will buy it ?

(ii) she will not buy it ?

OR

A bag contains 3 red, 4 green and 5 white candles, one candle is drawn at random from the bag, find the probability that candle is not red.

24. In the given figure, if $AB = AC$, prove that $BE = CE$.

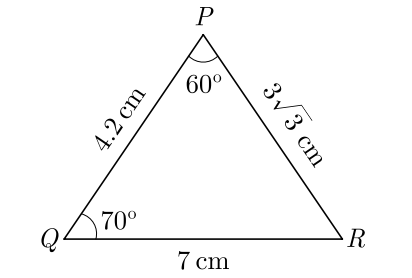


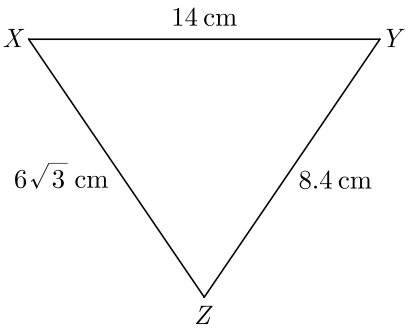
25. $ABCD$ is a trapezium in which $AB \,||\, CD$ and its diagonals intersect each other at the point O. Show that $\frac{AO}{BO} = \frac{CO}{DO}$.

OR

In the given figures, find the measure of $\angle X$.

Continue on next page.....





SECTION - C

Section C consists of 6 questions of 3 marks each.

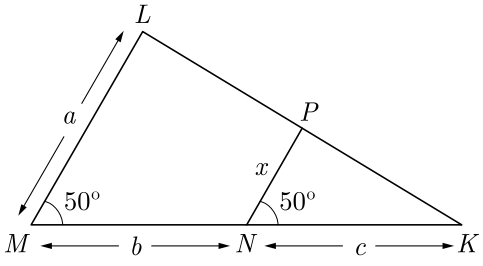
26. If in a triangle ABC right angled at B, $AB = 6$ units and $BC = 8$ units, then find the value of $\sin A \cos C + \cos A \sin C$.

27. If the sum and product of the zeroes of the polynomial $ax^2 - 5x + c$ are equal to 10 each, find the value of 'a' and 'c'.

28. If in $\Delta ABC, AD$ is median and $AE \perp BC$, then prove that $AB^2 + AC^2 = 2AD^2 + \frac{1}{2}BC^2$.

OR

In the given figure, find the value of x in terms of a, b and c.



Continue on next page.....

29. A metallic solid sphere of radius 10.5 cm melted and recasted into smaller solid cones each of radius 3.5 cm and height 3 cm. How may cones will be made ?

OR

A cylindrical tub, whose diameter is 12 cm and height 15 cm is full of ice-cream. The whole ice-cream is to be divided into 10 children in equal ice-cream cones, with conical base surmounted by hemispherical top. If the height of conical portion is twice the diameter of base, find the diameter of conical part of ice-cream cones.

30. Write the smallest number which is divisible by both 306 and 657.

31. Given the linear equation $2x+3y-8=0$, write another linear equation in two variables such that the geometrical representation of the pair so formed is :

(a) Intersecting lines

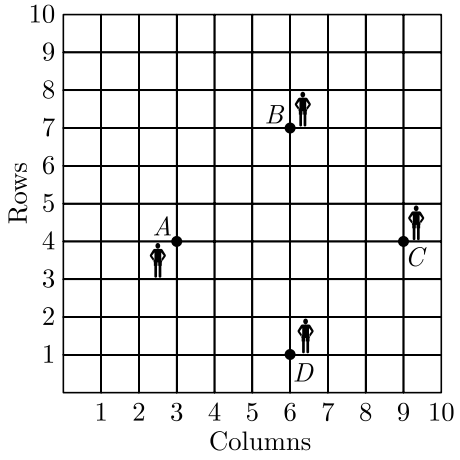
(b) Parallel lines

(c) Coincident lines.

SECTION - D

Section D consists of 4 questions of 5 marks each.

32. In a classroom, 4 friends are seated at the points A, B, C, and D as shown in Figure. Champa and Chameli walk into the class and after observing for a few minutes Champa asks Chameli, Don't you think $ABCD$ is a square? Chameli disagrees. Using distance formula, find which of them is correct.



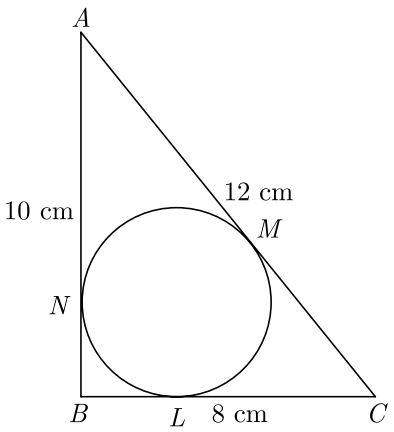
33. Find x in terms of a, b and c : $\frac{a}{x-a}+\frac{b}{x-b}=\frac{2c}{x-c}, x \neq a, b, c$

OR

Write all the values of p for which the quadratic equation $x^2+px+16=0$ has equal roots. Find the roots of the equation so obtained.

Continue on next page.....

34. In figure, a circle is inscribed in a ΔABC having sides $BC = 8\,\text{cm}$, $AB = 10\,\text{cm}$ and $AC = 12\,\text{cm}$. Find the length BL, CM and AN.



35. If the median of the following frequency distribution is 32.5. Find the values of f_1 and f_2.

Class	0- 10	10-20	20-30	30-40	40-50	50-60	60-70	Total
Frequency	f_1	5	9	12	f_2	3	2	40

OR

Literacy rates of 40 cities are given in the following table. It is given that mean literacy rate is 63.5, then find the missing frequencies x and y.

Literacy rate (in %)	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
Number of cities	1	2	3	x	y	6	8	4	2	3	2

SECTION - E

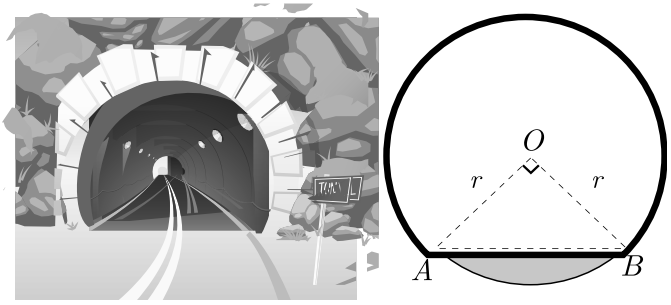
Section E consists of 3 case study based questions of 4 marks each.

36. Atal Tunnel : Atal Tunnel (also known as Rohtang Tunnel) is a highway tunnel built under the Rohtang Pass in the eastern Pir Panjal range of the Himalayas on the Leh-Manali Highway in Himachal Pradesh. At a length of 9.02 km, it is the longest tunnel above 10,000 feet (3,048 m) in the world and is named after former Prime Minister of India, Atal Bihari Vajpayee. The tunnel reduces the travel time and overall distance between Manali and Keylong on the way to Leh. Moreover, the tunnel bypasses most of the sites that were prone to road blockades, avalanches, and traffic snarls.

Continue on next page.....



Earth is excavated to make a railway tunnel. The tunnel is a cylinder of radius 7 m and length 450 m. A level surface is laid inside the tunnel to carry the railway lines. Figure given below shows the circular cross - section of the tunnel. The level surface is represented by AB, the centre of the circle is O and $\angle AOB = 90^\circ$. The space below AB is filled with rubble (debris from the demolition buildings).



(i) How much volume of earth is removed to make the tunnel ?

(ii) If the cost of excavation of 1 cubic meter is Rs 250, what is the total cost of excavation?

(iii) A coating is to be done on the surface of inner curved part of tunnel. What is the area of tunnel to be being coated ? Costing of coating is Rs 30 per m^2. What is the total cost of coating ?

OR

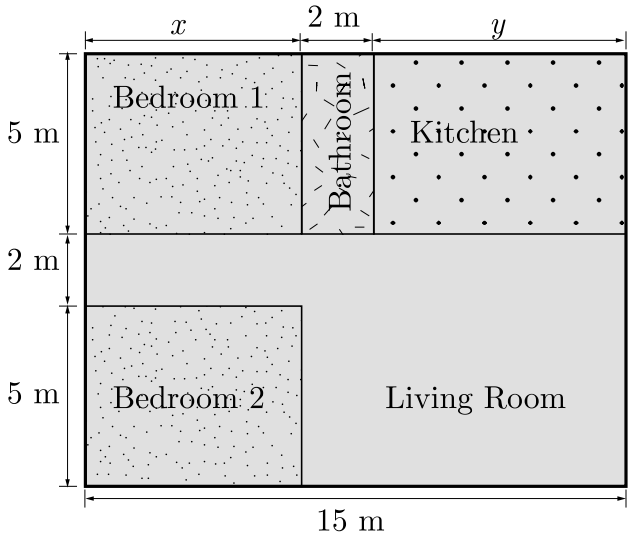
(iv) How much volume of debris is required to fill the ground surface of tunnel ?

Continue on next page.....

37. Architect : An architect is a skilled professional who plans and designs buildings and generally plays a key role in their construction. Architects are highly trained in the art and science of building design. Since they bear responsibility for the safety of their buildings' occupants, architects must be professionally licensed.



Varsha is a licensed architect and design very innovative house. She has made a house layout for her client which is given below. In the layout, the design and measurements has been made such that area of two bedrooms and kitchen together is 95 sq.m.



(i) Which pair of linear equations does describe this situation ?

(ii) What is the length of the outer boundary of the layout.

(iii) What is the area of bedroom 1 ? What is the area of living room in the layout ?

(iv) What is the cost of laying tiles in Kitchen at the rate of Rs. 50 per sq. m ?

Continue on next page.....

38. Swimming Pool : The volume of water in a rectangular, in-ground, swimming pool is given by $V(x) = x^3 + 11x^2 + 24x$ where $V(x)$ is the volume in cubic feet when the water is x ft high.

(i) Find the dimension of base of pool.

(ii) Use the remainder theorem to find the volume when $x = 3$ ft.

(iii) If the volume is 100 ft^3 of water, what is the height x ?

OR

(iv) If the maximum capacity of the pool is 520 ft^3 what is the maximum depth?



****