Sample Paper 09

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. The value of k for which the system of equations $x + y - 4 = 0$ and $2x + ky = 3$, has no solution, is

(a) -2 (b) $\neq 2$

(c) 3 (d) 2

2. If one root of the quadratic equation $ax^2 + bx + c = 0$ is the reciprocal of the other, then

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

(c) $ac = 1$ (d) $a = c$

3. The pair of equations $3^{x+y} = 81$, $81^{x-y} = 3$ has

(a) No solution (b) Unique solution

(c) Infinitely many solutions (d) $x = 2\frac{1}{8}, y = 1\frac{7}{8}$

4. 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) $400\ \text{cm}^2$

5. The co-ordinates of the point which is reflection of point $(-3, 5)$ in x-axis are

(a) (3, 5) (b) (3, -5)

(c) $(-3, -5)$ (d) $(-3, 5)$

6. C is the mid-point of PQ, if P is $(4, x)$, C is $(y, -1)$ and Q is $(-2, 4)$, then x and y respectively are

(a) -6 and 1 (b) -6 and 2

(c) 6 and -1 (d) 6 and -2

7. Consider the following frequency distribution of the heights of 60 students of a class

Height (in cm)	150-155	155-160	160-165	165-170	170-175	175-180
Number of students	15	13	10	8	9	5

The upper limit of the median class in the given data is

(a) 165 (b) 155

(c) 160 (d) 170

8. If one zero of a quadratic polynomial $(kx^2 + 3x + k)$ is 2, then the value of k is

(a) $\frac{5}{6}$ (b) $-\frac{5}{6}$

(c) $\frac{6}{5}$ (d) $-\frac{6}{5}$

9. The centroid of the triangle whose vertices are $(3, -7)$,$(-8, 6)$ and (5, 10) is

(a) (0, 9) (b) (0, 3)

(c) (1, 3) (d) (3, 5)

10. The zeroes of the polynomial $x^2 - 3x - m(m + 3)$ are

(a) $m, m + 3$ (b) $-m, m + 3$

(c) $m, -(m + 3)$ (d) $-m, -(m + 3)$

11. What is the common difference of an AP in which $a_{18} - a_{14} = 32$?

(a) 8 (b) -8

(c) -4 (d) 4

12. A card is drawn from a deck of 52 cards. The event E is that card is not an ace of hearts. The number of outcomes favourable to E is

(a) 4 (b) 13

(c) 48 (d) 51

13. The first term of AP is p and the common difference is q, then its 10th term is

(a) $q + 9p$ (b) $p - 9q$

(c) $p + 9q$ (d) $2p + 9q$

14. Two chords AB and CD of a circle intersect at E such that $AE = 2.4$ cm, $BE = 3.2$ cm and $CE = 1.6$ cm . The length of DE is

(a) 1.6 cm (b) 3.2 cm

(c) 4.8 cm (d) 6.4 cm

15. If $\cos 9\alpha = \sin\alpha$ and $9\alpha < 90^\circ$, then the value of $\tan 5\alpha$ is

(a) $\frac{1}{\sqrt{3}}$ (b) $\sqrt{3}$

(c) 1 (d) 0

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

(a) 90° (b) 45°

(c) 30° (d) 75°

17. If a circular grass lawn of 35 m in radius has a path 7 m wide running around it on the outside, then the area of the path is

(a) $1450\,\text{m}^2$ (b) $1576\,\text{m}^2$

(c) $1694\,\text{m}^2$ (d) $3368\,\text{m}^2$

18. Two poles of height 6 m and 11 m stand vertically upright on a plane ground. If the distance between their foot is 12 m, then distance between their tops is

(a) 12 m (b) 14 m

(c) 13 m (d) 11 m

19. **Assertion :** The HCF of two numbers is 5 and their product is 150, then their LCM is 30
Reason : For any two positive integers a and b, $\text{HCF}(a,b) + \text{LCM}(a,b) = a \times b$.

(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 :** $4x^2 - 12x + 9 = 0$ has repeated roots.

Reason : The quadratic equation $ax^2 + bx + c = 0$ have repeated roots if discriminant $D > 0$.

(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 ratio in which the point $(-3, k)$ divides the line segment joining the points $(-5, -4)$ and $(-2, 3)$. Also find the value of k.

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22. From an external point P, tangents PA and PB are drawn to a circle with centre O. If $\angle PAB = 50^{\circ}$, then find $\angle AOB$.

23. Write a rational number between $\sqrt{2}$ and $\sqrt{3}$.

OR

Explain why $(7 \times 13 \times 11) + 11$ and $(7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1) + 3$ are composite numbers.

24. Find the 7^{th} term from the end of AP $7, 10, 13, \ldots . 184$.

OR

The fourth term of an AP is 11. The sum of the fifth and seventh terms of the AP is 34. Find the common difference.

25. How many two digits numbers are divisible by 3?

SECTION - C

Section C consists of 6 questions of 3 marks each.

26. Two dice are tossed simultaneously. Find the probability of getting

(i) an even number on both dice.

(ii) the sum of two numbers more than 9.

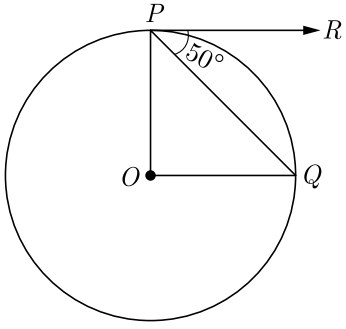
27. An electric pole is 10 m high. A steel wire tied to top of the pole is affixed at a point on the ground to keep the pole up right. If the wire makes an angle of 45° with the horizontal through the foot of the pole, find the length of the wire. [Use $\sqrt{2} = 1.414$]

28. Solve for x : $\frac{1}{x+4} - \frac{1}{x+7} = \frac{11}{30}$ $x \neq -4, \ -7$.

29. Prove that the rectangle circumscribing a circle is a square.

OR

If O is centre of a circle, PQ is a chord and the tangent PR at P makes an angle of 50° with PQ, find $\angle POQ$.



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30. From a solid right circular cylinder of height 14 cm and base radius 6 cm, a right circular cone of same height and same base removed. Find the volume of the remaining solid.

OR

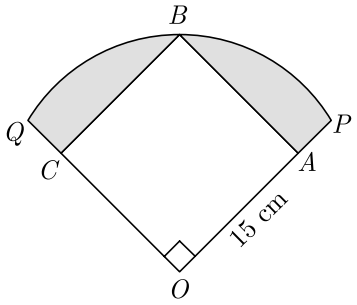
A metallic cylinder has radius 3 cm and height 5 cm. To reduce its weights, a conical hole is drilled in the cylinder. The conical hole has a radius of $\frac{3}{2}$ cm and its depth $\frac{8}{9}$ cm. Calculate the ratio of the volume of metal left in the cylinder to the volume of metal taken out in conical shape.

31. A fraction becomes $\frac{1}{3}$ when 2 is subtracted from the numerator and it becomes $\frac{1}{2}$ when 1 is subtracted from the denominator- Find the fraction.

SECTION - D

Section D consists of 4 questions of 5 marks each.

32. In Figure, a square $OABC$ is inscribed in a quadrant $OPBQ$. If $OA = 15\,\text{cm}$, find the area of the shaded region. (Use $\pi = 3.14$).



33. Find the zeroes of the quadratic polynomial $7y^2 - \frac{11}{3}y - \frac{2}{3}$ and verify the relationship between the zeroes and the coefficients.

OR

If α and β are the zeroes the polynomial $2x^2 - 4x + 5$, find the values of

(i) $\alpha^2 + \beta^2$

(ii) $\frac{1}{\alpha} + \frac{1}{\beta}$

(iii) $(\alpha - \beta)^2$

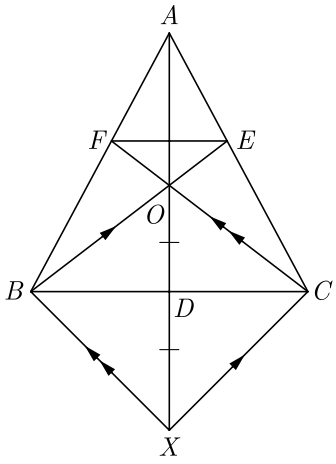
(iv) $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$

(v) $\alpha^2 + \beta^2$

34. In ΔABC, AD is a median and O is any point on AD. BO and CO on producing meet AC and AB at E and F respectively. Now AD is produced to X such that $OD = DX$ as shown in figure.
Prove that :
(1) $EF \,||\, BC$

(2) $AO : AX = AF : AB$

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35. If $\sin A = \frac{3}{4}$ calculate $\sec A$.

SECTION - E

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

36. Heart Rate : The heart rate is one of the 'vital signs,' or the important indicators of health in the human body. It measures the number of times per minute that the heart contracts or beats. The speed of the heartbeat varies as a result of physical activity, threats to safety, and emotional responses. The resting heart rate refers to the heart rate when a person is relaxed. While a normal heart rate does not guarantee that a person is free of health problems, it is a useful benchmark for identifying a range of health issues. After the age of 10 years, the heart rate of a person should be between 60 and 100 beats per minute while they are resting.



Thirty women were examined by doctors of AIIMS and the number of heart beats per minute were recorded and summarised as follows.

Number of heart beats per minute	Number of women (f_i)
65-68	2
68-71	4
71-74	3
74-77	8
77-80	7
80-83	4
83-86	2

Based on the above information, answer the following questions.

(i) What is the mean heart beats per minute for these women ?

(ii) What is the upper limit of median value of heart beats per minute for these women ?

(iii) What is the lower limit of mode value of heart beats per minute for these women ?

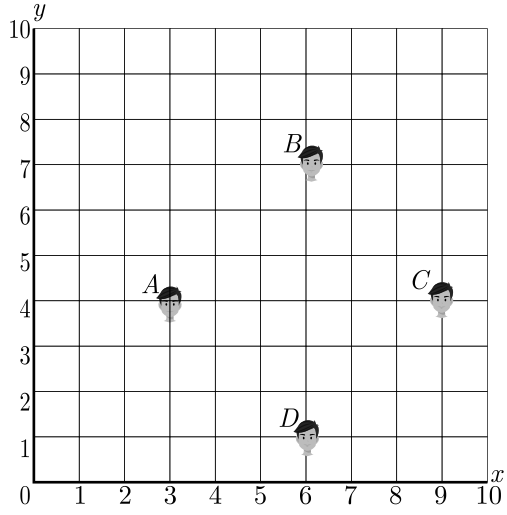
OR

How many women are having heart beat in range 68-77?

37. Morning assembly is an integral part of the school's schedule. Almost all the schools conduct morning assemblies which include prayers, information of latest happenings, inspiring thoughts, speech, national anthem, etc. A good school is always particular about their morning assembly schedule. Morning assembly is important for a child's development. It is essential to understand that morning assembly is not just about standing in long queues and singing prayers or national anthem, but it's something beyond just prayers. All the activities carried out in morning assembly by the school staff and students have a great influence in every point of life. The positive effects of attending school assemblies can be felt throughout life.



Have you noticed that in school assembly you always stand in row and column and this make a coordinate system. Suppose a school have 100 students and they all assemble in prayer in 10 rows as given below.



Here A, B, C and D are four friend Amar, Bharat, Colin and Dravid.

(i) What is the distance between A and B ?

(ii) What is the distance between C and D ?

(iii) What is the distance between A and C ?

OR

What is the distance between D and B ?

38. Volume of a Bird Cage. A company makes rectangular shaped bird cages with height b inches and square bottoms. The volume of these cages is given by the function $V = b^3 - 6b^2 + 9b$.

(i) Find an expression for the length of each side of the square bottom.

(ii) Use the function to find the volume of a cage with a height of 18 inches.

(iii) Use the remainder theorem to find the volume of a cage with a height of 15 inches.



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