Sample Paper 03

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. In an AP, if $a = 3.5$, $d = 0$ and $n = 101$, then a_n will be

(a) 0 (b) 3.5

(c) 103.5 (d) 104.5

2. There are 30 cards of the same size in a bag in which the numbers 1 to 30 are written. One card is taken out of the bag at random. What is the probability that the number on the selected card is not divisible by 3?

(a) $\frac{1}{15}$ (b) $\frac{2}{3}$

(c) $\frac{1}{10}$ (d) $\frac{1}{3}$

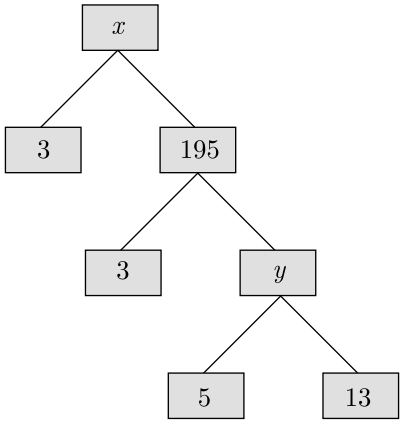
3. If the mid-point of the line segment joining the points $A(3, 4)$ and $B(k, 6)$ is $P(x, y)$ and $x + y - 10 = 0$, the value of k will be

(a) 4 (b) 5

(c) 6 (d) 7

Continue on next page.....

4. In the given factor tree what is the composite number x?



(a) 65 (b) 585
(c) 130 (d) 195

5. Two concentric circles are of radii 10 cm and 8 cm, then the length of the chord of the larger circle which touches the smaller circle is
(a) 6 cm (b) 12 cm
(c) 18 cm (d) 9 cm

6. If $\Delta ABC \sim \Delta PQR$, and $\frac{AB}{PQ} = \frac{1}{3}$, then $\frac{ar(\Delta ABC)}{ar(\Delta PQR)} = ?$
(a) $\frac{1}{3}$ (b) $\frac{1}{9}$
(c) $\frac{8}{9}$ (d) $\frac{5}{9}$

7. If $\sec\theta \cdot \sin\theta = 0$, then value of θ will be
(a) 0 (b) 90°
(c) 45° (d) ∞

8. $\tan^4\theta + \tan^2\theta = ?$
(a) $\sec^2\theta - 2\sec^4\theta$ (b) $2\sec^2\theta - \sec^4\theta$
(c) $\sec^2\theta - \sec^4\theta$ (d) $\sec^4\theta - \sec^2\theta$

9. Ratio of volumes of two cylinders with equal height is
(a) $H:h$ (b) $R:r$
(c) $R^2:r^2$ (d) None of these

10. Which of the following are the zeroes of the polynomial $p(x) = 2x^3 - 11x^2 + 17x - 6$.
(a) 2 (b) 3
(c) $\frac{1}{2}$ (d) Above all

Continue on next page.....

11. Consider the following frequency distribution

Class	0-5	6-11	12-17	18-23	24-29
Frequency	13	10	15	8	11

The upper limit of the median class is

(a) 17 (b) 17.5

(c) 18 (d) 18.5

12. What do you say about the lines represented by ?
$2x+3y-9=0$ and $4x+6y-18=0$

(a) Lines are parallel (b) Lines are coincident

(c) Lines are intersecting (d) Can't say anything

13. The zeroes of the polynomial $p(x)=4x^2-12x+9$ will be

(a) $\frac{3}{2}$ and $\frac{3}{2}$ (b) $\frac{2}{3}$ and $\frac{1}{3}$

(c) $\frac{2}{3}$ and $\frac{1}{3}$ (d) $\frac{1}{3}$ and $\frac{1}{3}$

14. A tree is broken by the wind. The top struck the ground at an angle of 30° and at distance of 10 m from its root. The whole height of the tree is ($\sqrt{3}=1.732$)

(a) $10\sqrt{3}$ m (b) $3\sqrt{10}$ m

(c) $20\sqrt{3}$ m (d) $3\sqrt{20}$ m

15. If the equations $kx-2y=3$ and $3x+y=5$ represent two intersecting lines at unique point, then the value of k is ..... .

(a) $k=-6$ (b) $k\neq -6$

(c) $k=4$ (d) $k\neq 4$

16. What are the values of x and y for the following system of equations.
$\frac{21}{x}+\frac{47}{y}=110,\ \frac{47}{x}+\frac{21}{y}=162,\ x,\ y\neq 0$

(a) $\frac{1}{3}$ and $\frac{1}{2}$ (b) $\frac{1}{3}$ and 1

(c) $\frac{1}{2}$ and $\frac{1}{3}$ (d) $\frac{1}{2}$ and 1

17. The quadratic equation $x^2-4x-3\sqrt{2}=0$ has

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

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

18. The quadratic equation $x^2+4x-3\sqrt{2}=0$ has

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

(c) no real roots (d) more than 2 real roots

Continue on next page.....

19. **Assertion :** If the circumference of a circle is 176 cm, then its radius is 28 cm.
Reason : Circumference $= 2\pi \times$ radius

(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 :** Common difference of the AP -5, -1, 3, 7, ... is 4.
Reason : Common difference of the AP $a, a+d, a+2d, ...$ is given by $d = a_2 - a_1$

(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.

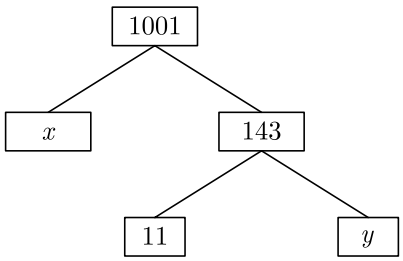
SECTION - B

Section B consists of 5 questions of 2 marks each.

21. If the point $P(x, y)$ is equidistant from the points $Q(a+b, b-a)$ and $R(a-b, a+b)$, then prove that $bx = ay$.

22. Prove that the lengths of two tangents drawn from an external point to a circle are equal.

23. What are the values of x and y in the given figure ?



OR

Given that HCF (306, 1314) = 18. Find LCM (306, 1314)

24. In a certain AP 32^{th} term is twice the 12^{th} term. Prove that 70^{th} term is twice the 31^{st} term.

OR

Find the middle term of the AP 213, 205, 197, ... 37.

Continue on next page.....

25. Which term of the AP 3, 15, 27, 39, ... will be 120 more than its 21st term?

SECTION - C

Section C consists of 6 questions of 3 marks each.

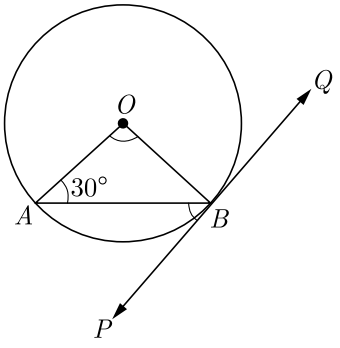
26. The angles of depression of the top and bottom of a 50 m high building from the top of a tower are 45° and 60° respectively. Find the height of the tower and the horizontal distance between the tower and the building. (Use $\sqrt{3} = 1.73$)

27. Solve for x : $\frac{x+1}{x-1}+\frac{x-2}{x+2}=4-\frac{2x+3}{x-2}; x \neq 1, -2, 2$

28. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.

OR

In the figure, PQ is a tangent to a circle with centre O. If $\angle OAB = 30^{\circ}$, find $\angle ABP$ and $\angle AOB$.



29. A solid is in the shape of a hemisphere surmounted by a cone. If the radius of hemisphere and base radius of cone is 7 cm and height of cone is 3.5 cm, find the volume of the solid. (Take $\pi = \frac{22}{7}$)

OR

The rain water from 22 m $\times$ 20 m roof drains into cylindrical vessel of diameter 2 m and height 3.5 m. If the rain water collected from the roof fills $\frac{4th}{5}$ of cylindrical vessel then find the rainfall in cm.

30. In a family of three children, find the probability of having at least two boys.

31. Represent the following pair of linear equations graphically and hence comment on the condition of consistency of this pair.

$x - 5y = 6$ and $2x - 10y = 12$.

Continue on next page.....

SECTION - D

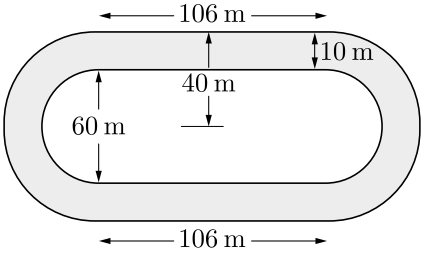
Section D consists of 4 questions of 5 marks each.

32. If α and β are the zeroes of polynomial $p(x) = 3x^2 + 2x + 1$, find the polynomial whose zeroes are $\frac{1-\alpha}{1+\alpha}$ and $\frac{1-\beta}{1+\beta}$.

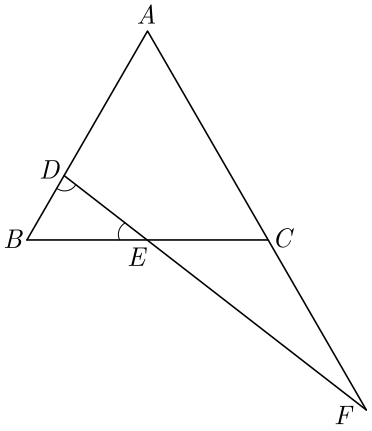
OR

If α and β are zeroes of the polynomial $p(x) = 6x^2 - 5x + k$ such that $\alpha - \beta = \frac{1}{6}$, Find the value of k.

33. Figure depicts a racing track whose left and right ends are semi-circular. The distance between the two inner parallel line segments is 60 m and they are each 106 m long. If the track is 10 m wide everywhere, find the area of the track.



34. In the figure, $\angle BED = \angle BDE$ and E is the mid-point of BC. Prove that $\frac{AF}{CF} = \frac{AD}{BE}$.



35. Prove that: $\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta\,\mathrm{cosec}\,\theta$

OR

If $15\tan^2\theta + 4\sec^2\theta = 23$, then find the value of $(\sec\theta + \mathrm{cosec}\,\theta)^2 - \sin^2\theta$.

Continue on next page.....

SECTION - E

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

36. Cost of Production : The cost to produce bottled spring water is given by $C(x) = 16x - 63$ where x is the number of thousands of bottles. The total income (revenue) from the sale of these bottles is given by the function $R(x) = -x^2 + 326x - 7463$.

(i) Since Profit = Revenue − Cost, find the profit function.

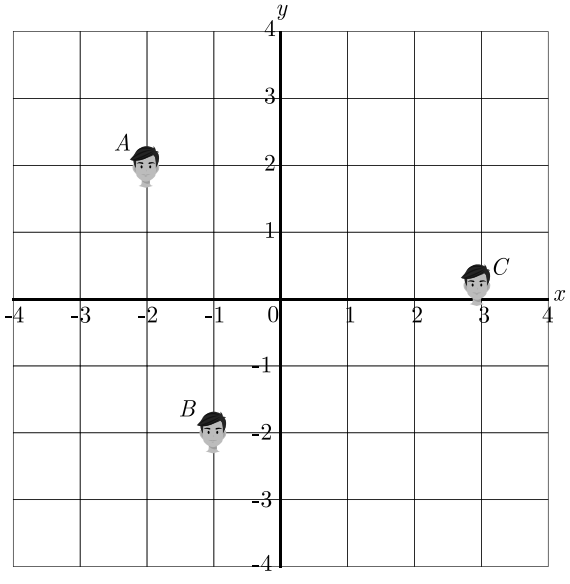
(ii) How many bottles sold will produce the maximum profit?

(iii) What is the maximum profit?

(iv) Find the profit when 245 thousand bottles are sold. Use remainder theorem



37. Ajay, Bhigu and Colin are fast friend since childhood. They always want to sit in a row in the classroom . But teacher doesn't allow them and rotate the seats row-wise everyday. Bhigu is very good in maths and he does distance calculation everyday. He consider the centre of class as origin and marks their position on a paper in a co-ordinate system. One day Bhigu make the following diagram of their seating position.



(i) What is the distance of point A from origin ?

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

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

(iv) A point D lies on the line segment between points A and B such that $AD:DB=4:3$. What are the coordinates of point D ?

38. Sulfur dioxide (SO_2) is a colorless gas at ambient temperature and pressure. It is soluble in water and forms sulfurous acid which is slowly oxidized to sulfuric acid by dissolved oxygen.



Sulfur dioxide is a major air pollutant and has significant impacts upon human health. In addition, the concentration of sulfur dioxide in the atmosphere can influence the habitat suitability for plant communities, as well as animal life. Sulfur dioxide emissions are a precursor to acid rain and atmospheric particulates.
To find out the concentration of SO_2 in the air (in parts per million, i.e. ppm), the data was collected for 30 localities in a Delhi and is presented below:

Concentration of SO_2 (in ppm)	Frequency
0.00-0.04	4
0.04-0.08	9
0.08-0.12	9
0.12-0.16	2
0.16-0.20	4
0.20-0.24	2

Based on the above information, answer the following questions.

(i) What is the mean concentration of SO_2 in the air?

(ii) What is the lower limit of median value of concentration of SO_2 in the air?

(iii) Find the median value concentration of SO_2 in the air.

(iv) How many localities are having SO_2 in range 0.04-0.16 ppm ?

****