Sample Paper 24

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 $ad \neq bc$, then what do you say about the solution of the pair of linear equations $ax + by = p$ and $cx + dy = q$?

(a) No solution (b) Unique solution

(c) Infinitely solution (d) Can't say anything

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

$3x + 2y - 7 = 0$ $4x + y - 6 = 0$

(a) 1 and 2 (b) 2 and 2

(c) 1 and 1 (d) –1 and –1

3. The quadratic equation $2x^2 - 3\sqrt{2}\,x + \frac{9}{4} = 0$ has

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

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

4. From an external point P, tangents PA and PB are drawn to a circle with centre O. If CD is the tangent to the circle at a point E and $PA = 14$ cm. The perimeter of ΔPCD is

(a) 14 cm (b) 21 cm

(c) 28 cm (d) 35 cm

5. If $\tan A = \cot B$, then the value of $(A + B)$ is

(a) 90° (b) 120°

(c) 60° (d) 180°

6. If the angle of depression of an object from a 75 m high tower is 30°, then the distance of the object from the tower is

(a) $25\sqrt{3}$ m (b) $50\sqrt{3}$ m

(c) $75\sqrt{3}$ m (d) 150 m

7. ΔABC is an equilateral triangle of side $2a$, then length of one of its altitude is ..... .

(a) $a\sqrt{3}$ (b) $a2\sqrt{3}$

(c) $a3\sqrt{2}$ (d) $a\sqrt{2}$

8. A pair of dice is thrown once. What is the probability of getting a doublet?

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

(c) $\frac{1}{6}$ (d) $\frac{1}{5}$

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

(a) 8 (b) -8

(c) -4 (d) 4

10. If the radius of the sphere is increased by 100%, the volume of the corresponding sphere is increased by

(a) 200% (b) 500%

(c) 700% (d) 800%

11. In a circle of radius 14 cm, an arc subtends an angle of 45° at the centre, then the area of the sector is

(a) $71\,\text{cm}^2$ (b) $76\,\text{cm}^2$

(c) $77\,\text{cm}^2$ (d) $154\,\text{cm}^2$

12. In the formula $\overline{x} = a + \dfrac{\sum f_i d_i}{\sum f_i}$, for finding the mean of grouped data d_i's are deviation from a of

(a) Lower limits of the classes (b) Upper limits of the classes

(c) Mid-points of the classes (d) Frequencies of the class marks

13. The n^{th} term of the AP a, $3a$, $5a$, ... is

(a) na (b) $(2n-1)\,a$

(c) $(2n+1)\,a$ (d) $2na$

14. If $\cos A = \dfrac{2}{5}$, the value of $4 + 4\tan^2 A$ will be

(a) 1 (b) 2

(c) 4 (d) 25

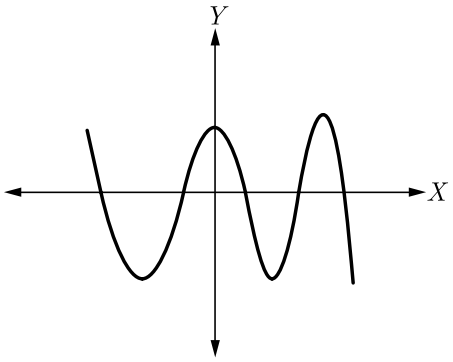
15. a and b are two positive integers such that the least prime factor of a is 3 and the least prime factor of b is 5. Then the least prime factor of $(a+b)$ will be

(a) 1 (b) 2

(c) 3 (d) 4

Continue on next page.....

16. The graph of $y = p(x)$, where $p(x)$ is a polynomial in variable x, is as follows.



The number of zeroes of $p(x)$ is ..... .

(a) 2 (b) 3

(c) 4 (d) 5

17. The zeroes of the quadratic polynomial $\sqrt{3}\,x^2 - 8x + 4\sqrt{3}$ are

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

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

18. Select the quadratic polynomial $p(x)$ with 3 and $-\frac{2}{5}$ as sum and product of its zeroes, respectively.

(a) $x^2 - 3x - \frac{2}{5}$

(b) $x^2 - 3x - 2$

(c) $5x^2 - 15x - 2$

(d) $15x^2 - 5x + \frac{2}{5}$

19. **Assertion :** The value of y is 6, for which the distance between the points $P(2, -3)$ and $Q(10, y)$ is 10.

Reason : Distance between two given points $A(x_1, y_1)$ *and* $B(x_2, y_2)$ is given, $AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

(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.

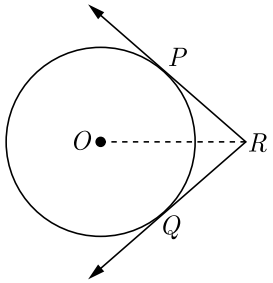
(d) Assertion (A) is false but reason (R) is true.

Continue on next page.....

SECTION - B

Section B consists of 5 questions of 2 marks each.

21. In figure, two tangents RQ and RP are drawn from an external point R to the circle with centre O. If $\angle PRQ = 120^\circ$, then prove that $OR = PR + RQ$.

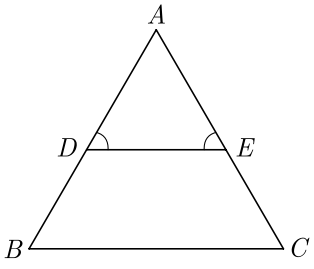


22. Find the value of λ, if the mode of the following data is 20 :
15, 20, 25, 18, 13, 15, 25, 15, 18, 17, 20, 25, 20, λ, 18.

OR

The mean and median of 100 observation are 50 and 52 respectively. The value of the largest observation is 100. It was later found that it is 110. Find the true mean and median.

23. In Figure $\angle D = \angle E$ and $\frac{AD}{DB} = \frac{AE}{EC}$, prove that ΔBAC is an isosceles triangle.



24. Prove that $3 + \sqrt{5}$ is an irrational number.

OR

Show that any positive even integer can be written in the form $6q, 6q+2$ or $6q+4$, where q is an integer.

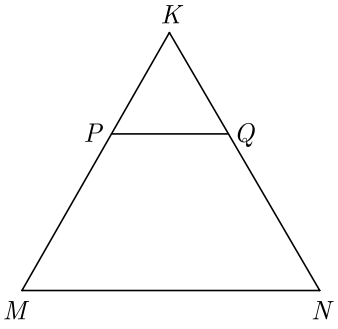
25. If $\sqrt{3}\sin\theta - \cos\theta = 0$ and $0^\circ < \theta < 90^\circ$, find the value of θ.

Continue on next page.....

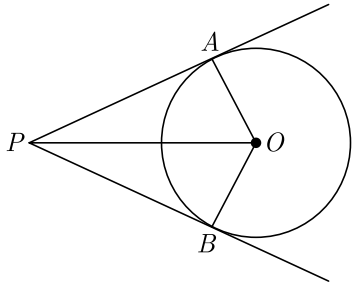
SECTION - C

Section C consists of 6 questions of 3 marks each.

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



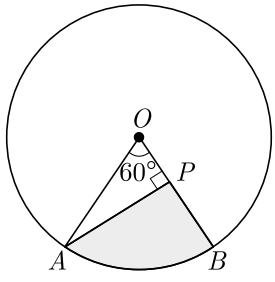
27. In the given figure, OP is equal to the diameter of a circle with centre O and PA and PB are tangents. Prove that ABP is an equilateral triangle.



28. The circumference of a circle exceeds the diameter by 16.8 cm. Find the radius of the circle. Use $\pi = \frac{22}{7}$

OR

In the given figure, AOB is a sector of angle 60° of a circle with centre O and radius 17 cm. If $AP \perp OB$ and $AP = 15$ cm, find the area of the shaded region.



29. Show that : $\frac{\cos^2(45^\circ+\theta)+\cos^2(45^\circ-\theta)}{\tan(60^\circ+\theta)\tan(30^\circ-\theta)}=1$

30. A child has a die whose six faces show the letters as shown below:

$\boxed{A}$ $\boxed{A}$ $\boxed{B}$ $\boxed{C}$ $\boxed{C}$ $\boxed{C}$

The die is thrown once. What is the probability of getting (i) A, (ii) C ?

OR

A game consists of tossing a coin 3 times and noting the outcome each time. If getting the same result in all the tosses is a success, find the probability of losing the game.

31. Prove that $\sqrt{3}$ is an irrational number.

SECTION - D

Section D consists of 4 questions of 5 marks each.

32. Draw the graphs of the equations $x-y+1=0$ and $3x+2y-12=0$. Determine the co-ordinates of the vertices of the triangle formed by these lines and the X-axis and shade the triangular region.

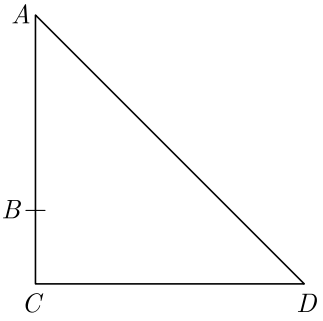
OR

The cost of 2 kg of apples and 1kg of grapes on a day was found to be Rs. 160. After a month, the cost of 4kg of apples and 2kg of grapes is Rs. 300. Represent the situations algebraically and geometrically.

33. In $\Delta ABC, AD$ is the median to BC and in $\Delta PQR, PM$ is the median to QR. If $\frac{AB}{PQ}=\frac{BC}{QR}=\frac{AD}{PM}$. Prove that $\Delta ABC \sim \Delta PQR$.

OR

In the right triangle, B is a point on AC such that $AB+AD=BC+CD$. If $AB=x, BC=h$ and $CD=d$, then find x (in term of h and d).



34. A right triangle whose sides are 20 cm and 15 cm is made to revolve about its hypotenuse. Find the volume and the surface area of the double cone so formed. (Use $\pi=3.14$)

Continue on next page.....

35. Show that $A(6, 4)$, $B(5, -2)$ and $C(7, -2)$ are the vertices of an isosceles triangle.

SECTION - E

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

36. Optimal Pricing Strategy : The director of the National School of Drama must decide what to charge for a ticket to the comedy drama. If the price is set too low, the theatre will lose money; and if the price is too high, people won't come. From past experience she estimates that the profit P from sales (in hundreds) can be approximated by $P(x) = -x^2 + 22x - 40$ where x is the cost of a ticket and $0 \le x \le 25$ hundred rupees.



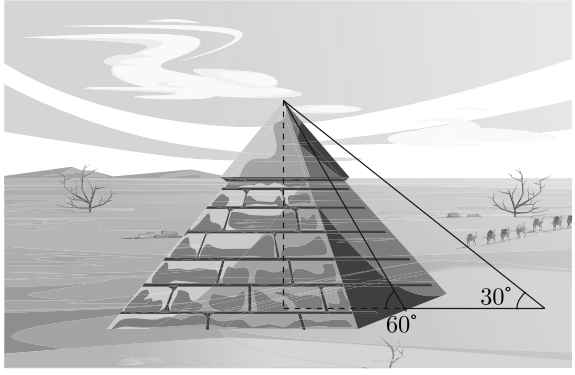
(i) What is the lowest cost of a ticket that would allow the theatre to break even? What is the highest cost that the theatre can charge to break even?

(ii) If theatre charge Rs 4 hundred for each ticket, what is the profit/loss ?

(iii) If theatre charge Rs 25 hundred for each ticket, what is the profit/loss ?

(iv) What is the maximum profit which can be earned by theatre ?

37. Height of a Pyramid : The angle of elevation to the top of the Egyptian pyramid of Cheops is 30° measured from a point 50 meter from the base of the pyramid. The angle of elevation from the base of a face of the pyramid is 60°.



(i) Find the height of the Cheops pyramid.

(ii) Find the side of base of pyramid.

Continue on next page.....

38. An inspector in an enforcement squad of electricity department visit to a locality of 100 families and record their monthly consumption of electricity, on the basis of family members, electronic items in the house and wastage of electricity, which is summarise in the following table.

Monthly Consumption (in kwh)	Number of families
0-100	2
100-200	5
200-300	x
300-400	12
400-500	17
500-600	20
600-700	y
700-800	9
800-900	7
900-1000	4

Inspector calculated that median of the above data is 525 and after that he lost two data which is given as x and y in table.

Based on the above information, answer the following questions.

(i) What is the value of lost data x ?

(ii) What is the value of lost data y ?

(iii) What will be the upper limit of the modal class?



****