Sample Paper 22

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 A and B are acute angles and $\sin A = \cos B$, then the value of $A + B$ is

(a) $60°$ (b) $180°$

(c) $90°$ (d) $120°$

2. Select the quadratic polynomial whose sum and product of a the zeroes are $\frac{21}{8}$ and $\frac{5}{16}$ respectively

(a) $16x^2 - 42x + 5$ (b) $\frac{1}{16}(16x^2 - 42x + 5)$

(c) $\frac{1}{12}(16x^2 + 42x + 5)$ (d) $\frac{1}{12}(16x^2 + 42x - 5)$

3. $\frac{1}{1+\sin\theta} + \frac{1}{1-\sin\theta} = ?$

(a) 1 (b) $2\sec^2\theta$

(c) $2\sin^2\theta$ (d) $2\cos^2\theta$

4. Which of the following equations has the sum of its roots as 3 ?

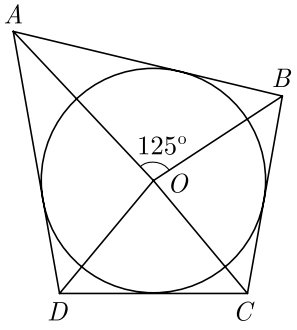
(a) $2x^2 - 3x + 6 = 0$

(b) $-x^2 + 3x - 3 = 0$

(c) $\sqrt{2}\,x^2 - \frac{3}{\sqrt{2}}x + 1 = 0$

(d) $3x^2 - 3x + 3 = 0$

5. In figure, if $\angle AOB = 125^\circ$, then $\angle COD$ is equal to



(a) 62.5° (b) 45°
(c) 35° (d) 55°

6. If $\Delta ABC \sim \Delta PQR$, $\frac{AB}{PQ} = \frac{1}{3}$, then $\frac{\text{ar}\,\Delta ABC}{\text{ar}\,\Delta PQR}$ will be

(a) $\frac{1}{3}$ (b) $\frac{1}{9}$
(c) $\frac{8}{9}$ (d) $\frac{5}{9}$

7. If HCF(336, 54) = 6, LCM(336, 54) will be

(a) 2024 (b) 3024
(c) 1012 (d) 1512

8. An observer, 1.5 m tall is 20.5 away from a tower 22 m high, then the angle of elevation of the top of the tower from the eye of observer is

(a) 30° (b) 45°
(c) 60° (d) 90°

9. What is the ratio in which the point $P(\frac{3}{4}, \frac{5}{12})$ divides the line segment joining the point $A\ (\frac{1}{2}, \frac{3}{2})$ and $(2, -5)$

(a) 4 : 7 (b) 3 : 7
(c) 1 : 5 (d) 2 : 5

10. Consider the following distribution :

Marks obtained	**Number of students**
More than or equal to 0	63
More than or equal to 10	58
More than or equal to 20	55
More than or equal to 30	51
More than or equal to 40	48
More than or equal to 50	42

The frequency of the class 30-40 is :

(a) 3 (b) 4
(c) 48 (d) 51

11. A right circular cylinder of radius r and height h (where, $h > 2r$) just encloses a sphere of diameter

(a) r (b) $2r$

(c) h (d) $2h$

12. Harpreet tosses two different coins simultaneously. What is the probability that she gets at least one head ?

(a) $\frac{1}{4}$ (b) $\frac{2}{4}$

(c) $\frac{3}{4}$ (d) 1

13. If the perimeter of a circle is equal to that of a square, then the ratio of their areas is

(a) 22:7 (b) 14:11

(c) 7:22 (d) 11:14

14. For what value of p will the following system of equations have no solution ?

$$(2p-1)x+(p-1)y = 2p+1;\ y+3x-1=0$$

(a) $p=2$ (b) $p \neq 2$

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

15. Zeroes of $f(x) = x^2 - 2x$ are

(a) 2 and 4 (b) 1 and 3

(c) 0 and 2 (d) 0 and 4

16. If the common difference of an AP is 5, then what is $a_{18} - a_{13}$?

(a) 5 (b) 20

(c) 25 (d) 30

17. For what value of k, the system of equations $kx+3y=1$, $12x+ky=2$ has no solution.

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

(c) $k=4$ (d) $k=-4$

18. 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

19. **Assertion :** If sum of the first n terms of an AP is given by $S_n = 3n^2 - 4n$. Then its n^{th} term is $a_n = 6n-7$.
Reason : n^{th} term of an AP, whose sum to n terms is S_n, is given by $a_n = S_n - S_{n-1}$

(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.

20. **Assertion :** $x+y-4=0$ and $2x+ky-3=0$ has no solution if $k=2$.

Reason : $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ are consistent if $\frac{a_1}{a_2} \neq \frac{k_1}{k_2}$.

(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).

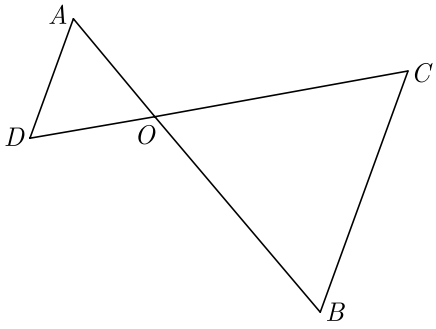
(c) Assertion (A) is true but reason (R) is false.

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

SECTION - B

Section B consists of 5 questions of 2 marks each.

21. In the given figure, $OA \times OB = OC \times OD$, show that $\angle A = \angle C$ and $\angle B = \angle D$.



22. Find the value of $\sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$ is it equal to $\sin 90^\circ$ or $\cos 90^\circ$?

23. Two different dice are thrown together. Find the probability that the product of the number appeared is less than 18.

OR

Harpreet tosses two different coins simultaneously. What is the probability that she gets :

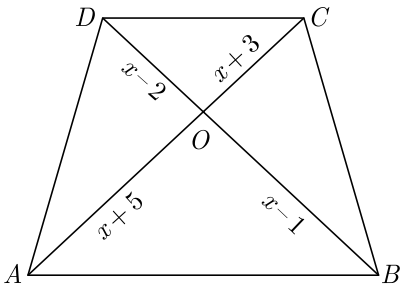
(i) at least one head ?

(ii) one head and one tail ?

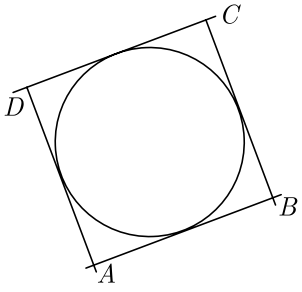
24. In a rectangle $ABCD, E$ is a point on AB such that $AE = \frac{2}{3}AB$. If $AB = 6$ km and $AD = 3$ km, then find DE.

OR

In the given figure, if $AB \,||\, DC$, find the value of x.



25. In figure, a circle touches all the four sides of a quadrilateral $ABCD$. If $AB = 6$ cm, $BC = 9$ cm and $CD = 8$ cm, then find the length of AD.



SECTION - C

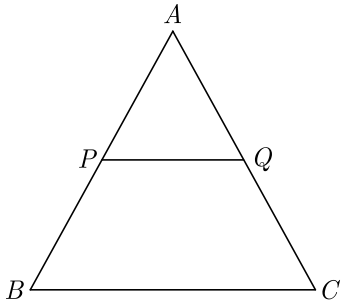
Section C consists of 6 questions of 3 marks each.

26. 144 cartons of Coke cans and 90 cartons of Pepsi cans are to be stacked in a canteen. If each stack is of the same height and if it equal contain cartons of the same drink, what would be the greatest number of cartons each stack would have?

27. Solve for x and y :

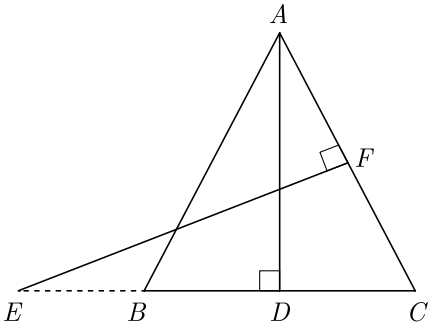
$$ax + by = \frac{a+b}{2} \quad 3x + 5y = 4$$

28. In the given figure, P and Q are the points on the sides AB and AC respectively of ΔABC, such that $AP = 3.5$cm, $PB = 7$ cm, $AQ = 3$ cm and $QC = 6$ cm. If $PQ = 4.5$ cm, find BC.



OR

In the given figure, $AB = AC$. E is a point on CB produced. If AD is perpendicular to BC and EF perpendicular to AC, prove that ΔABD is similar to ΔCEF.



29. Evaluate : $\dfrac{5\cos^2 60^\circ + 4\cos^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 60^\circ}$

30. A solid sphere of diameter 6 cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is 12 cm. If the sphere is completely submerged into water, by how much will the level of water rise in the cylindrical vessel ?

OR

A hemispherical tank, of diameter 3 m, is full of water. It is being emptied by a pipe at the rate of $3\frac{4}{7}$ litre per second. How much time will it take to make the tank half empty ? Use $\pi = \frac{22}{7}$

31. If one the zero of a polynomial $3x^2 - 8x + 2k + 1$ is seven times the other, find the value of k.

SECTION - D

Section D consists of 4 questions of 5 marks each.

32. Point A lies on the line segment XY joining $X(6, -6)$ and $Y(-4, -1)$ in such a way that $\frac{XA}{XY} = \frac{2}{5}$. If point A also lies on the line $3x + k(y + 1) = 0$, find the value of k.

33. Solve for x : $\dfrac{x-1}{2x+1} + \dfrac{2x+1}{x-1} = 2$ where $x \neq -\dfrac{1}{2}, 1$

OR

Find the positive values of k for which quadratic equations $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ both will have the real roots.

34. The arithmetic mean of the following frequency distribution is 53. Find the value of k.

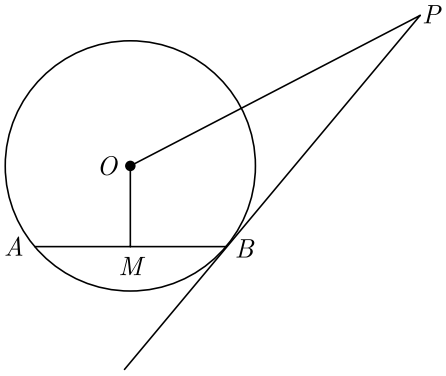
Class	0-20	20-40	40-60	60-80	80-100
Frequency	12	15	32	k	13

OR

The following distribution gives the weights of 60 students of a class. Find the mean and mode weights of the students.

Weight (in kg)	40-44	44-48	48-52	52-56	56-60	60-64	64-68	68-72
Number of students	4	6	10	14	10	8	6	2

35. PB is a tangent to the circle with centre O to B.AB is a chord of length 24 cm at a distance of 5 cm from the centre. It the tangent is length 20 cm, find the length of PO.



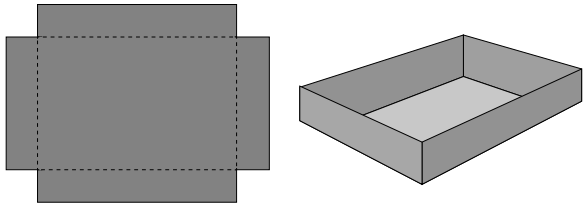
SECTION - E

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

36. Overflow Pan : A metalworker makes an overflow pan by cutting equal squares with sides of length x from the corners of a 30 cm by 20 cm piece of aluminium, as shown in the figure. The sides are then folded up and the corners sealed.

(i) Find a polynomial function $V(x)$ that gives the volume of the pan.

(ii) Find the volume of the pan if the height is 6 cm. Use remainder theorem.

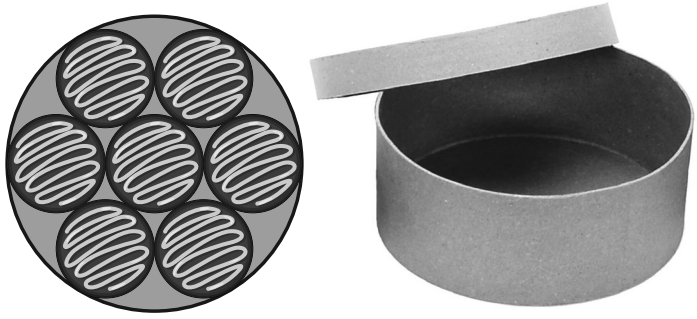


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37. A bakery is an establishment that produces and sells flour-based food baked in an oven such as bread, cookies, cakes, pastries, and pies. Some retail bakeries are also categorized as cafés, serving coffee and tea to customers who wish to consume the baked goods on the premises.



Tania runs a bakery shop and her bakery is very famous for tasty biscuits. The amount of mixture required to make one biscuit is 18 cu cm. Before it is cooked, the mixture is rolled into a sphere. After the biscuit is cooked, the biscuit becomes a cylinder of radius 3 cm and height 0.7 cm. The increase in volume is due to air being trapped in the biscuit. Biscuits are packed in a cylindrical card box of height 14 cm. The arrangement of biscuits is shown below.



(i) What is the volume of the biscuits after it is cooked ? What is the volume of air trapped, while cooking the biscuit ?

(ii) How many biscuits will be there in a box ?

(iii) How much space is vacant in box after biscuits are packed ?

OR

If weight of 7 biscuits is 50 grams, what will be the weight of box of biscuits ?

Continue on next page.....

38. Mr. RK Agrawal is owner of a famous amusement park in Delhi. The ticket charge for the park is Rs 150 for children and Rs 400 for adult.



Generally he does not go to park and it is managed by team of staff. One day Mr Agrawal decided to random check the park and went there. When he checked the cash counter, he found that 480 tickets were sold and Rs 134500 was collected.

(i) Let the number of children visited be x and the number of adults visited be y. Which of the following is the correct system of equations that model the problem ?

(ii) How many children visited the park ? How many adults visited the park?

(iii) How much amount collected if 300 children and 350 adults visited the park?

(iv) One day total visited children and adults together is 750 and the total amount collected is Rs 212500. What are the number of children and adults visited the park ?

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