

Total No. of Printed Pages : 7

Question Booklet Sl. No.

MATHEMATICS

(English Version)

Time : 3 Hours 15 Minutes

Max. Marks : 100

Instructions :

- 1) In the duration of **3 hours 15 minutes**, **15 minutes** of time is allotted to read the question paper.
- 2) **All** the answers shall be written in the answer booklet **only**.
- 3) Question paper consists of **4 Sections** and **33 Questions**.
- 4) **Internal** choice is available in Section – **IV only**.
- 5) Answers shall be written **neatly** and **legibly**.

SECTION - I

(12×1=12)

Note : i) Answer **all** the questions in **one** word or a phrase.
ii) **Each** question carries **1** mark.

1. L.C.M. and H.C.F. of two numbers are 60 and 3 respectively. If one number is 12, then the other number is
- A) 15 B) 25
C) 35 D) 45
2. The zero of the polynomial $p(x) = ax + b$ is
- A) $\frac{-a}{b}$ B) $\frac{b}{a}$
C) $\frac{-b}{a}$ D) $\frac{a}{b}$
3. Create a binomial, whose degree is 3.

4. Generate a pair of linear equations in two variables which are intersecting lines.

5. Assertion (A) : -5 is the common difference of an AP : $5, 0, -5, \dots$

Reason (R) : The common difference of an AP is $d = a_n - a_{n-1}$.

Now choose the correct answer.

A) Both (A) and (R) are true and (R) is the correct explanation of (A)

B) Both (A) and (R) are true, but (R) is not the correct explanation of (A)

C) (A) is true, but (R) is false

D) (A) is false, but (R) is true

6. If $\triangle ABC \sim \triangle XYZ$, then which of the following is true ?

A) $\angle A = \angle Z$

B) $AB = XY$

C) $\frac{AC}{BC} = \frac{XZ}{YZ}$

D) $\angle B = \angle Z$

7. If $\sin \theta = \frac{1}{2}$, then $\theta =$

A) 90°

B) 60°

C) 45°

D) 30°

8. If the length of a shadow of a man is equal to the height of the man, then the angle of elevation is 45° . (True/False)

9. Volume of a sphere having radius "r" is

A) $\frac{4}{3}\pi r^3$

B) $\frac{3}{4}\pi r^3$

C) $\frac{2}{3}\pi r^3$

D) $\frac{3}{2}\pi r^3$

10. The sum of the probabilities of all elementary events of an experiment is
 A) 1 B) 0
 C) $\frac{1}{3}$ D) $\frac{1}{2}$
11. Create a geometrical design involving two tangents drawn from an external point to the circle.
12. Form a quadratic equation in x , whose coefficient of x^2 is 3, coefficient of x is -4 and its constant term is 2.

SECTION – II

(8×2=16)

Note : i) Answer all the questions.

ii) Each question carries 2 marks.

13. Create a quadratic polynomial, whose sum and product of zeroes are 1 and $\frac{3}{2}$ respectively.
14. Analyse the nature of roots of quadratic equation $2x^2 - 5x + 1 = 0$.
15. Define Basic Proportionality Theorem.
16. Find the value of $(\sin\theta + \cos\theta)^2 + (\sin\theta - \cos\theta)^2$.
17. Define angle of elevation.
18. The length of a tangent from a point A at a distance 5 cm from the centre of the circle is 4 cm. Find the radius of the circle.
19. Find the curved surface area of hemisphere whose radius is 7 cm.
20. Write the formula to find :
 i) The point divides the joining of two points (x_1, y_1) and (x_2, y_2) internally in the ratio $m_1 : m_2$.
 ii) The mid point of two points (x_1, y_1) and (x_2, y_2) .

SECTION - III

Note : i) Answer **all** the questions.

ii) **Each** question carries **4** marks.

21. Explain how -2 and $\frac{3}{2}$ are the roots of the equation $2x^2 + x - 6 = 0$.

22. Write the formula to calculate the n^{th} term of an AP. Find the 10^{th} term of AP 3, 7, 11,

23. Express the trigonometric ratios $\cos A$, $\tan A$, $\operatorname{cosec} A$ and $\sec A$ in terms of $\sin A$.

24. Prove that the parallelogram circumscribing a circle is a rhombus.

25. A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius.

The total height of the toy is 15.5 cm. Find the total surface area of the toy.

26. Write the formula to find mean by step deviation method of a grouped data and explain the terms in it.

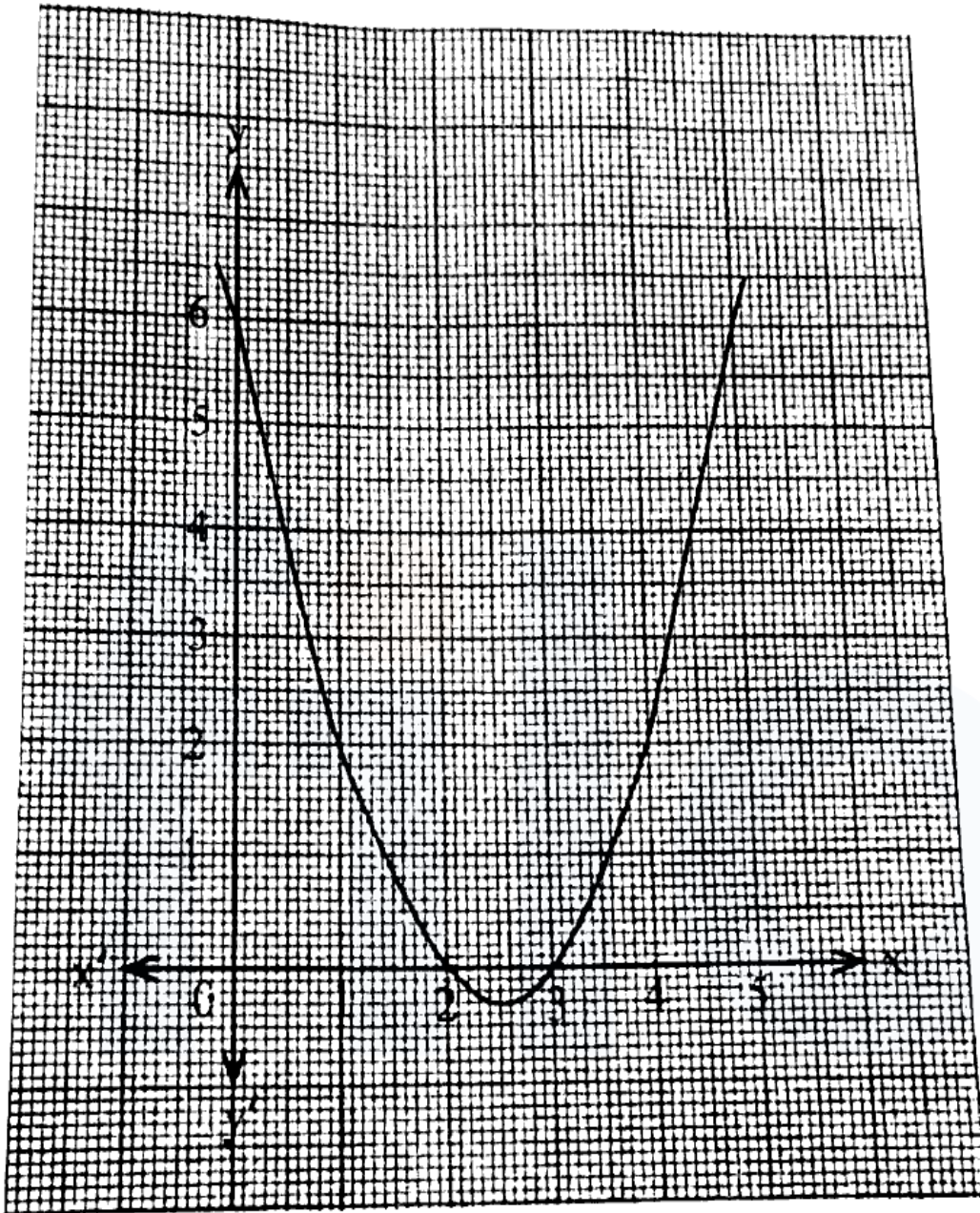


27. Two dice are thrown at the same time.

Based on the above data create 4 questions similar to the example given below.

What is the probability that the sum of two numbers appearing on the top of the dice is 8?

28. Observe the given graph and answer the following questions.



- a) What is the shape of the graph ?
- b) Write the number of zeroes of the polynomial represented in the graph.
- c) Find the sum of the zeroes of the polynomial represented in the graph.
- d) Find the product of the zeroes of the polynomial represented in the graph.

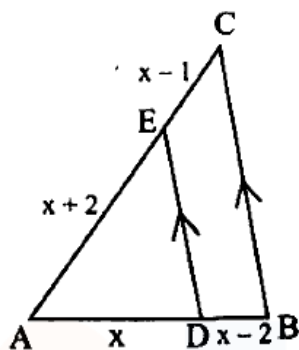
SECTION - IV

- Note : i) Answer **all** the questions.
 ii) Each question carries **8** marks.
 iii) There is an **internal** choice for **each** question.

29. a) Justify the irrationality of $\sqrt{3}$.

OR

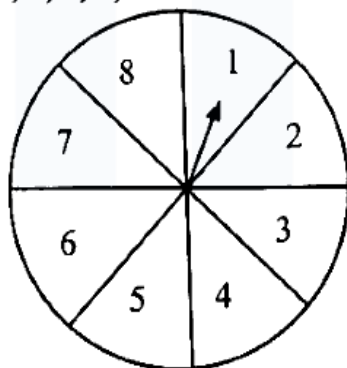
- b) In the figure, $DE \parallel BC$. If $DB = x - 2$, $AD = x$, $AE = x + 2$ and $EC = x - 1$, find the value of x .



30. a) Identify which type of triangle can be made with the vertices $(5, -2)$, $(6, 4)$ and $(7, -2)$. Justify your answer.

OR

- b) Find the area of the sector of a circle with radius 4 cm and of angle 30° . Also, find the area of the corresponding major sector. (use $\pi = 3.14$)
31. a) A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 and these are equally likely outcomes.



What is the probability that it will point at

- 8
- an odd number
- a number greater than 2
- a number less than 9

OR

- b) From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45° respectively. If the bridge is at a height of 3 m from the banks, find the width of the river.

32. a) The distribution below gives the weights of 30 students of a class. Find the median weight of the students using the cumulative frequencies.

Weight (in kg)	40 – 45	45 – 50	50 – 55	55 – 60	60 – 65	65 – 70	70 – 75
No. of Students	2	3	8	6	6	3	2

OR

- b) If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289, show that the sum of first n terms is n^2 .
33. a) Solve the following pair of linear equations graphically.
 $x - y + 1 = 0$
 $3x + 2y - 12 = 0$
- OR
- b) Form the pair of linear equations in the following situation and find their solution graphically.
 10 students of Class X took part in a Mathematics quiz. If the number of girls is 2 more than the number of boys, find the number of boys and girls who took part in the quiz.
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