

# Class 10 Mathematics

## Previous Year Practice Question Paper

*Based on the Latest Board Examination Pattern*

**Time Allowed: 3 Hours**

**Maximum Marks: 80**

### General Instructions:

1. This Question Paper has 5 Sections A, B, C, D, and E.
2. **Section A** has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. **Section B** has 5 Very Short Answer-I (VSA) type questions carrying 2 marks each.
4. **Section C** has 6 Short Answer (SA) type questions carrying 3 marks each.
5. **Section D** has 4 Long Answer (LA) type questions carrying 5 marks each.
6. **Section E** has 3 Case Based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All questions are compulsory. However, an internal choice in some questions has been provided.
8. Draw neat figures wherever required. Take  $\pi = 22/7$  wherever required if not stated.

### SECTION A (1 Mark Each)

*Multiple Choice Questions. Select the correct option.*

1. The HCF of 96 and 404 is:

(a) 120 (b) 4 (c) 10 (d) 3

2. The roots of the quadratic equation  $x^2 - 3x - 10 = 0$  are:

(a) 5, -2 (b) -5, 2 (c) 5, 2 (d) -5, -2

3. The distance of the point  $P(3, 4)$  from the origin is:

(a) 3 units (b) 4 units (c) 5 units (d) 7 units

4. If in two triangles  $ABC$  and  $DEF$ ,  $\frac{AB}{DE} = \frac{BC}{FE} = \frac{CA}{FD}$ , then:

(a)  $\triangle FDE \sim \triangle CAB$  (b)  $\triangle FDE \sim \triangle ABC$  (c)  $\triangle CBA \sim \triangle FDE$  (d)  $\triangle BCA \sim \triangle FDE$

5. If  $\sin A = \frac{3}{4}$ , calculate  $\cos A$ :

(a)  $\frac{4}{5}$  (b)  $\frac{\sqrt{7}}{4}$  (c)  $\frac{3}{\sqrt{7}}$  (d)  $\frac{\sqrt{7}}{3}$

6. A die is thrown once. The probability of getting a prime number is:

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

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

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

(d)  $\frac{2}{3}$

7. The empirical relationship between the three measures of central tendency is:

(a)  $3 \text{ Median} = \text{Mode} + 2 \text{ Mean}$

(b)  $3 \text{ Mean} = \text{Mode} + 2 \text{ Median}$

(c)  $3 \text{ Mode} = \text{Mean} + 2 \text{ Median}$

(d)  $\text{Mode} = 3 \text{ Mean} - 2 \text{ Median}$

8. The common difference of the AP  $\frac{1}{p}, \frac{1-p}{p}, \frac{1-2p}{p}, \dots$  is:

(a)  $p$

(b)  $-p$

(c)  $-1$

(d)  $1$

9. The number of tangents that can be drawn to a circle from a point outside the circle is:

(a)  $1$

(b)  $2$

(c)  $3$

(d) Infinite

10. The volume of a right circular cylinder of base radius  $r$  and height  $h$  is:

(a)  $\frac{1}{3}\pi r^2 h$

(b)  $\pi r^2 h$

(c)  $2\pi r h$

(d)  $2\pi r(r + h)$

(Note: Questions 11-20 in the full exam format continue similarly with assertion-reasoning and standard MCQs. For practice, proceed to Section B.)

### SECTION B (2 Marks Each)

Very Short Answer Questions.

21. Find a quadratic polynomial, the sum and product of whose zeroes are  $\frac{1}{4}$  and  $-1$ , respectively.
22. Evaluate:  $2 \tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ$ .
23. Find the area of a quadrant of a circle whose circumference is 22 cm.
24. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.
25. In a class test, the sum of Shefali's marks in Mathematics and English is 30. Formulate a quadratic equation if she got 2 marks more in Mathematics and 3 marks less in English, and the product of her marks would have been 210.

### SECTION C (3 Marks Each)

Short Answer Questions.

26. Prove that  $\sqrt{3}$  is an irrational number.
27. Solve the following pair of linear equations graphically:

$$x + y = 5$$

$$2x - 3y = 4$$

28. Prove that the lengths of tangents drawn from an external point to a circle are equal.
29. From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are  $45^\circ$  and  $60^\circ$  respectively. Find the height of the tower.
30. A metallic sphere of radius 4.2 cm is melted and recast into the shape of a cylinder of radius 6 cm. Find the height of the cylinder.
31. The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is Rs 18. Find the missing frequency  $f$ .

| Daily Allowance (in Rs) | 11-13 | 13-15 | 15-17 | 17-19 | 19-21 | 21-23 | 23-25 |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Number of children      | 7     | 6     | 9     | 13    | $f$   | 5     | 4     |

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### SECTION D (5 Marks Each)

*Long Answer Questions.*

32. State and prove the Basic Proportionality Theorem (Thales Theorem). **OR**  
Prove that if a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side.
33. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.
34. Water in a canal, 6 m wide and 1.5 m deep, is flowing with a speed of 10 km/h. How much area will it irrigate in 30 minutes, if 8 cm of standing water is needed?
35. The median of the following data is 525. Find the values of  $x$  and  $y$ , if the total frequency is 100.

| Class Interval | Frequency |
|----------------|-----------|
| 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         |

**SECTION E (4 Marks Each)**

*Case Study Based Questions.*

**36. Case Study 1: Arithmetic Progression in Real Life**

Your elder brother wants to buy a car and plans to take a loan from a bank for his car. He repays his total loan of Rs 1,18,000 by paying every month starting with the first instalment of Rs 1000. If he increases the instalment by Rs 100 every month, answer the following:

- (i) What is the amount paid by him in the 30th instalment? **(1 Mark)**
- (ii) What is the total amount paid by him in the 30 instalments? **(1 Mark)**
- (iii) What amount does he still have to pay after the 30th instalment? **(2 Marks)**

**37. Case Study 2: Coordinate Geometry - Sports Day**

In a sports day celebration, Ram, Shyam, and Mohan are standing at positions  $A(2,3)$ ,  $B(5,6)$ , and  $C(8,3)$  respectively on a coordinate grid drawn on the playground.

- (i) Find the distance between Ram and Shyam. **(1 Mark)**
- (ii) Find the coordinates of the midpoint of the line segment joining Ram and Mohan. **(1 Mark)**
- (iii) Determine if the triangle formed by Ram, Shyam, and Mohan is an isosceles triangle. Justify your answer. **(2 Marks)**

**38. Case Study 3: Applications of Trigonometry**

A group of students visited a lighthouse. From the top of the 75 m high lighthouse from the sea-level, the angles of depression of two ships are  $30^\circ$  and  $45^\circ$ . If one ship is exactly behind the other on the same side of the lighthouse, answer the following:

- (i) Draw a neat rough sketch representing the situation. **(1 Mark)**
- (ii) Find the distance of the first ship (closer to the lighthouse) from the base of the lighthouse. **(1 Mark)**
- (iii) Find the distance between the two ships. **(2 Marks)**

— END OF PAPER —