

Mathematics Class 10 Board Sample paper-1

Time allowed: 3 hours Maximum Marks: 80

General Instructions:

- All questions are compulsory.
- The question paper consists of 30 questions divided into four sections – A, B, C and D.
- Section A contains 6 questions of 1 mark each which are multiple choice questions, Section B contains 6 questions of 2 marks each, Section C contains 10 questions of 3 marks each and Section D contains 8 questions of 4 marks each.
- There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and three questions of 4 marks each. You must attempt only one of the alternatives in all such questions
- Use of calculator is not permitted.

Section A

- Find the value of k for which the equation $2x^2 + kx + 3 = 0$ has equal roots?
- If the radius of a sphere is doubled, its volume becomes x times the volume of original sphere, what is the value of x
 - 2
 - 4
 - 8
 - 16
- A box contains 3 blue, 2 white and 4 red marbles. If a marble is drawn at random from the box, the probability that it will not be a white marble is:
 - $\frac{2}{9}$
 - $\frac{4}{9}$
 - $\frac{5}{9}$
 - $\frac{7}{9}$
- The areas of two similar triangles ABC and PQR are in the ratio 9 : 16. If $BC = 4.5$ cm, find the length of QR.
- Write whether the rational number $\frac{7}{75}$ will have a terminating decimal expansion or a non-terminating repeating decimal expansion.

6. Find the value of k for which the system of equations $x + 2y - 3 = 0$ and $ky + 5x + 7 = 0$ has a unique solution.

Section B

7. Find the solution of the equation $x^2 - 5x + 6 = 0$

8. Find the sum of the first 23 terms of the AP 7, 21/2, 14.....?

9. A box contains 12 balls of which some are red in colour. If 6 more red balls are put in the box and a ball is drawn at random, the probability of drawing a red ball doubles than what it was before. Find the number of red balls in the bag.

10. The radii of two circles are 6 cm and 8 cm. Find the radius of the circle whose area is equal to the sum of areas of two circles.

11. Prove that for any positive integer n , $n^3 - n$ is divisible by 6

12. If $\sin A + \sin^2 A = 1$, then find the value of $(\cos^2 A + \cos^4 A)$.

Section C

13. If $x^2 - 5x + 1 = 0$, Find the value of $x + 1/x$

14. Use Euclid's division lemma to show that the cube of any positive integer is of the form $9m$, $9m + 1$ or $9m + 8$.

15. The points $A(4, -2)$, $B(7, 2)$, $C(0, 9)$ and $D(-3, 5)$ form a parallelogram. Find the length of the altitude of the parallelogram on the base AB .

16. From the top of a hill 200 m high, the angles of depression of the top and the bottom of a pillar are 30° and 60° respectively. Find the height of the pillar and its distance from the hill

17. Rita saved Rs 5 in the first week of a year and then increased her weekly saving by Rs 1.75. If in the n^{th} week, her weekly savings become Rs 20.75, find n .

18. Find the value of p for which the points $(-1, 3)$, $(2, p)$ and $(5, 1)$ are collinear.

Or

Prove that the points $(3, 0)$, $(6, 4)$ and $(-1, 3)$ are vertices of a right-angled triangle. Also, prove that the vertices of an isosceles triangle.

19. If $\tan 2A = \cot (A - 180)$, where $2A$ is an acute angle. Find the value of A
 Or
 Evaluate

$$\frac{\operatorname{cosec}^2 63^\circ + \tan^2 24^\circ}{\cot^2 66^\circ + \sec^2 27^\circ} + \frac{\sin^2 63^\circ + \cos 63^\circ \sin 27^\circ + \sin 27^\circ \sec 63^\circ}{2(\operatorname{cosec}^2 65^\circ - \tan^2 25^\circ)}$$

20. Draw a circle of radius 6 cm. From a point 10cm away from its center, construct the pair of tangents to the circle and measure their lengths
 Or

Draw a right triangle in which the sides (other than hypotenuse) are length 5 cm and 4 cm. Then construct another triangle whose sides are $\frac{5}{3}$ times of the corresponding sides of the given triangle

21. A circus tent is cylindrical up to a height of 3 cm and conical above it. If the diameter of the base is 105 m and the slant height of the conical part is 53m. Find the total canvas used in making the tent

22. In a quadrilateral ABCD, given that $\angle A + \angle D = 90^\circ$. Prove that $AC^2 + BD^2 = AD^2 + BC^2$

Section D

23. Solve for x

$$\frac{1}{a} + \frac{1}{b} + \frac{1}{x} = \frac{1}{a+b+x}$$

Where $a \neq 0$, $b \neq 0$ and $a+b+x \neq 0$

24. if $\frac{a^{n+1} + b^{n+1}}{a^n + b^n}$ is the Arithmetic Mean between a and b , then find the value of n
25. Show that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

26. The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is Rs 18. Find the missing frequency k

Daily pocket allowance (in ₹)	11–13	13–15	15–17	17–19	19–21	21–23	23–25
Number of children	3	6	9	13	k	5	4

Or

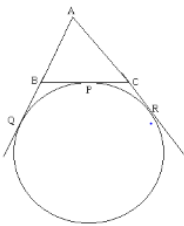
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The following frequency distribution shows the distance (in meters) thrown by 68 students in a Javelin throw competition

Distance (in m)	0–10	10–20	20–30	30–40	40–50	50–60	60–70
Number of students	4	5	13	20	14	8	4

Draw a less than type Ogive for the given data and find the median distance thrown using this curve.

27. A circle touches the side BC of the triangle ABC at P and it touches AB and AC when extended at Q and R respectively



Show that

$$AQ = \frac{1}{2}(AB+BC+AC)$$

Or

Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line-segment joining the points of contact at the centre.

28. A hemispherical bowl of internal radius 9 cm is full of liquid. The liquid is to be filled into cylindrical shaped small bottles each of diameter 3 cm and height 4 cm. How many bottles are needed to empty the bowl?

Or

A solid is in the form of a right circular cylinder with hemispherical ends. The total height of the solid is 19 cm and diameter of the cylinder is 7 cm. Find the total surface area and volume of the solid.

29. An airplane flying at a height of 4000 m from the ground passes vertically above another airplane at an instant when the angle of elevation of the two planes from the same point as the ground are 60° and 45° respectively. Find the vertical distance between the airplanes at that instant.

30. Kings and Queens are removed from a deck of cards. A card is drawn at random.

Find the probability of drawing the following:

1. a Spade and

2. a Red card
3. a King
4. a Face card
5. Not a Face card

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