CBSE Class 10 Maths (Standard) Question Paper 2020 Set 1

CLASS: 10TH

MATHEMATICS STANDARD SOLVED
SET 1 (CODE: 30/5/1) SERIES: JBB/5

ALL CENTRE

General Instructions:

Read the following instructions very carefully and strictly follow them:

i. This question paper comprises four sections – A, B, C and D. This question paper carries 40 questions. All questions are compulsory.

ii. Section A: Question numbers 1 to 20 comprises of 20 questions of one mark each.

iii. Section B: Question numbers 21 to 26 comprises of 6 questions of two marks each.

iv. Section C: Question numbers 27 to 34 comprises of 8 questions of three marks each.

v. Section D: Question numbers 35 to 40 comprises of 6 questions of four marks each.

vi. There is no overall choice in the question paper. However, an internal choice has been provided in 2 questions of one mark, 2 questions of two marks, 3 questions of three marks and 3 questions of four marks. You have to attempt only one of the choices in such questions.

vii. In addition to this, separate instructions are given with each section and question, wherever necessary.

viii. Use of calculators is not permitted.

SECTION – A

Question numbers 1 to 20 carry 1 mark each.

Question numbers 1 to 10 are multiple choice questions.

Choose the correct option.

1. On dividing a polynomial p(x) by $x^2 - 4$, quotient and remainder are found to be x and 3 respectively. The polynomial p(x) is

   (a) $3x^2 + x - 12$ (b) $x^3 - 4x + 3$ (c) $x^2 + 3x - 4$ (d) $x^3 - 4x - 3$

2. In figure – 1, ABC is an isosceles triangle, right angled at C. Therefore

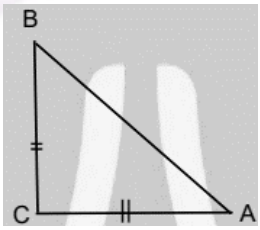

Figure-1

(a) $AB^2 = 2AC^2$ (b) $BC^2 = 2AB^2$ (c) $AC^2 = 2AB^2$ (d) $AB^2 = 4AC^2$

3. The point on the x-axis which is equidistant from (-4, 0) and (10, 0) is

(a) (7, 0) (b) (5, 0) (c) (0, 0) (d) (3, 0)

(OR)

The centre of a circle whose end points of a diameter are (-6, 3) and (6, 4) is

(a) (8, -1) (b) (4, 7) (c) $\left(0, \frac{7}{2}\right)$ (d) $\left(4, \frac{7}{2}\right)$

4. The value(s) of k for which the quadratic equation $2x^2 + 5x + 2 = 0$ has equal roots, is

(a) 4 (b) ± 4 (c) – 4 (d) 0

5. Which of the following is not A.P.?

(a) – 1.2, 0.8, 2.8, ….. (b) $3, 3+\sqrt{2}, 3+2\sqrt{2}, 3+3\sqrt{2}$

(c) $\frac{4}{3}, \frac{7}{3}, \frac{9}{3}, \frac{12}{3}, ...$ (d) $\frac{-1}{5}, \frac{-2}{5}, \frac{-3}{5}, ...$

6. The pair of linear equations $\frac{3x}{2} + \frac{5y}{3} = 7 \, and \, 9x + 10y = 14 \, is$

(a) Consistent (b) inconsistent (c) Consistent with one solution

(d) consistent with many solutions.

7. In figure – 2, PQ is tangent to the circle with centre at O, at the point B. If $\angle AOB = 100°, then \angle ABP$ is equal to

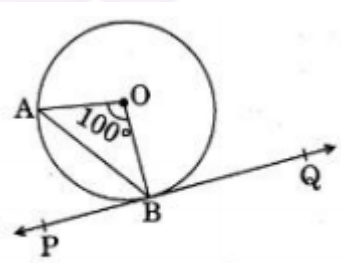

Figure-2

(a) 50° (b) 40° (c) 60° (d) 80°

8. The radius of a sphere (in cm) whose volume is 12π cm^3, is

(a) 3 (b) $3\sqrt{3}$ (c) $3^{\frac{2}{3}}$ (d) $3^{\frac{1}{3}}$

9. The distance between the points (m, -n) and (-m, n) is

(a) $\sqrt{m^2+n^2}$ (b) m + n (c) $2\sqrt{m^2+n^2}$ (d) $\sqrt{2m^2+2n^2}$

10. In figure – 3, from an external point P, two tangents PQ and PR are drawn to a circle of radius 4 cm with centre O. If $\angle QPR = 90°$, then length of PQ is

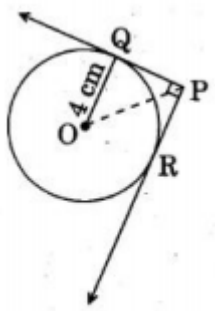

Figure-3

(a) 3 cm (b) 4 cm (c) 2 cm (d) $2\sqrt{2}\,cm$

Fill in the blanks in questions numbers 11 to 15.

11. The probability of an event that is sure to happen, is _____
12. Simplest form of $\frac{1+\tan^2 A}{1+\cot^2 A}$ is _____
13. AOBC is a rectangle whose three vertices are A(0, -3), O(0, 0) and B(4, 0). The length of its diagonals is _____
14. In the formula $\overline{x} = a + \left(\frac{\sum f_i u_i}{\sum f_i}\right) \times h$, u_i= _____
15. All concentric circles are _____ to each other.

Answer the following question numbers 16 to 20

16. Find the sum of the first 100 natural numbers.
17. In figure – 4, the angle of elevation of the top of a tower from a point C on the ground, which is 30 m away from the foot of the tower, is 30°. Find the height of the tower.

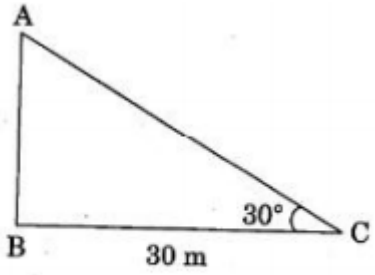

Figure-4

18. The LCM of two numbers is 182 and their HCF is 13. If one of the numbers is 26, find the other,
19. Form a quadratic polynomial, the sum and product of whose zeroes are (-3) and 2 respectively.

    (OR)

    Can $(x^2 - 1)$ be a remainder while dividing $x^4 - 3x^2 + 5x - 6$ by $(x^2 + 3)$?
20. Evaluate: $\dfrac{2\tan 45° \times \cos 60°}{\sin 30°}$

SECTION – B

Question numbers 21 to 26 carry 2 marks each.

21. In the figure – 5, DE || AC and DF || AE

    Prove that $\dfrac{BF}{FE} = \dfrac{BE}{EC}$

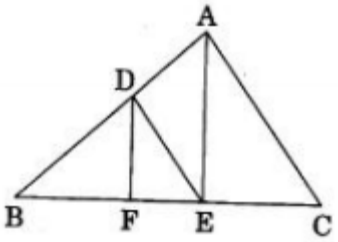

Figure-5

22. Show that $5 + 2\sqrt{7}$ is an irrational number, where $\sqrt{7}$ is given to be an irrational number

    (OR)

    Check whether 12^n can end with the digit 0 for any natural number n.

    $12^n = (2 \times 2 \times 3)^n$

23. If A, B and C are interior angles of a ΔABC, then show that $\cos\left(\frac{B+C}{2}\right)=\sin\left(\frac{A}{2}\right)$

24. In figure – 6, a quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = BC + AD.

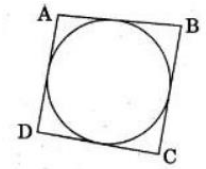

Figure-6

(OR)

In figure – 7, find the perimeter of ΔABC, if AP = 12 cm.

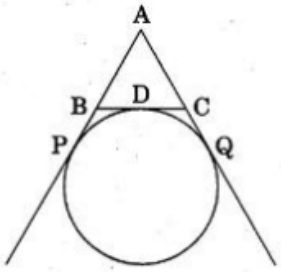

Figure-7

25. Find the mode of the following distribution.

Marks:	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Number of students:	4	6	7	12	5	6

26. 2 cubes, each of volume 125 cm^3, are joined end to end. Find the surface area of the resulting cuboid.

SECTION – C

Question numbers 27 to 34 carry 3 marks each.

27. A fraction becomes $\frac{1}{3}$ when 1 is subtracted from the numerator and it becomes $\frac{1}{4}$ when 8 is added to its denominator. Find the fraction.

(OR)

The present age of a father is three years more than three times the age of his son. Three years hence the father's age will be 10 years more than twice the age of the son. Determine their present ages.

28. Use Euclid Division Lemma to show that the square of any positive integer is either of the form 3q or 3q + 1 for some integer q.
29. Find the ratio in which the y-axis divides the line segment joining the points (6, -4) and (-2, -7). Also find the point of intersection.

(OR)

Show that the points (7, 10), (-2, 5) and (3, -4) are vertices of an isosceles right triangle.

30. Prove that $\sqrt{\frac{1+\sin A}{1-\sin A}} = \sec A + \tan A$
31. For an A.P., it is given that the first term (a) = 5, common difference (d) = 3 and the n^{th} term (a_n) = 50. Find n and sum of first n terms (S_n) of the A.P.
32. Construct a ΔABC with sides BC = 6 cm, AB = 5 cm and $\angle ABC = 60°$. Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of ΔABC.

(OR)

Draw a circle of radius 3.5 cm. Take a point P outside the circle at a distance of 7 cm from the centre of the circle and construct a pair of tangents to the circle from that point.

33. Read the following passage and answer the questions given at the end :

Diwali Fair

A game in a booth at a Diwali Fair involves using a spinner first. Then, if the spinner stops on an even number, the player is allowed to pick a marble from a bag. The spinner and the marbles in the bage are represented in Figure - 8.

Prizes are given, when a black marbles is picked. Shweta plays the same once.

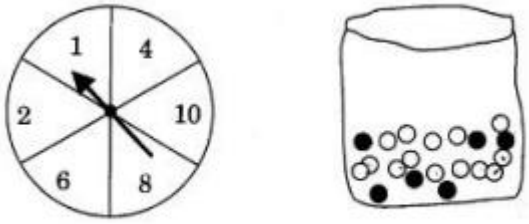

Figure-8

(i) What is the probability that she will be allowed to pick a marble from the bag?

(ii) Suppose she is allowed to pick a marble from the bag, what is the probability of getting a prize, when it is given that the bag contains 20 balls out of which 6 are black?

34. In figure-9, a square OPQR is inscribed in a quadrant OAQB of a circle. If the radius of circle is $6\sqrt{2}$ cm, find the area of the shaded region.

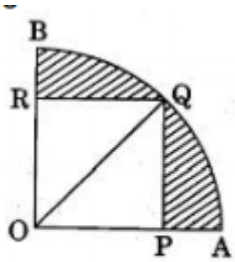

Figure-9

SECTION – D

Question numbers 35 to 40 carry 4 marks each.

35. Obtain other zeroes of the polynomial $p(x) = 2x^4 – x^3 – 11x2 + 5x + 5$ if two of its zeores are $\sqrt{5}$ *and* $-\sqrt{5}$.

(OR)

What minimum must be added to $2x^3 – 3x^2 + 6x + 7$ so that the resulting polynomial will be divisible by $x^2 – 4x + 8$?

36. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

37. Sum of the areas of two squares is 544 m^2. If the difference of their perimeter is 32 m, find the sides of the two squares.

(OR)

A motor boat whose speed is 18km/h in still water takes 1 hour more to go 24km upstream than to return downstream to the same spot. Find the speed of the stream.

38. A solid toy is in the form of a hemisphere surmounted by a right circular cone of same radius. The height of the cone is 10 cm and the radius of the base is 7 cm. Determine the volume of the toy. Also find the area of the coloured sheet required to cover the toy. $\left(Use\ \pi = \frac{22}{7}\ and\ \sqrt{149} = 12.2\right)$

39. A statue 1.6m tall, stands on the top of a pedestal.From a point on the ground, the angle of elevation of the top of the statue is 60° and from the same point the angle of elevation of the top of the pedestal is 45°. Find the height of the pedestal. $\left(Use\ \sqrt{3} = 1.73\right)$

40. For the following data, draw a 'less than' ogive and hence find the median of the distribution.

Age (in years)	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Number of persons	5	15	20	25	15	11	9

(OR)

The distribution given below shows the number of wickets taken by bowlers in one-day cricket matches. Find the mean and the median of the numbers of wickets taken.

Number of wickets:	20 – 60	60 – 100	100 – 140	140 – 180	180 – 220	220 – 260
Number of bowlers:	7	5	16	12	2	3