

Series: SOS

Code No. 30 / 1

Roll No.

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Candidates must write the code on the title page of the answer-book

Please check that this question paper contains 4 printed pages.

Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.

Please check that this question paper contains 29 questions.

Please write down the serial number of the question before attempting it.

Second Pre-Board Examination, 2018-2019
Mathematics

Grade: 10

Time allowed: 3 hours

Date: 27.01.2019

Maximum Marks: 80

General Instructions.

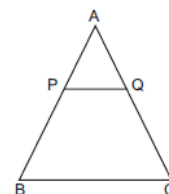
1. All questions are compulsory
2. This question paper contains 29 questions
3. Questions 1 – 6 in Section A are very short answer type questions carrying 1 mark each
4. Questions 7 – 12 in Section B are short answer type questions carrying 2 marks each
5. Questions 13 – 22 in Section C are long answer I type questions carrying 3 marks each
6. Questions 23 – 30 in Section D are long answer II type questions carrying 4 marks each
7. Read questions carefully before answering them.
8. Write neatly. Rough work may be done neatly in a working column or on the last page of your main sheet
9. Diagrams (if any) should be drawn neatly with pencil and labeled properly.
10. Write question numbers correctly.

Section A

Question numbers 1 to 6 carry 1 mark each.

1. In the figure, $PQ \parallel BC$ and $AP : PB = 1 : 2$. Find
(1)

$$\frac{\text{ar}(\triangle APQ)}{\text{ar}(\triangle ABC)}$$



2. Find the sum of first 22 terms of the AP 8, 3, - 2, ...

(1)

OR

Find the 12th term of the AP with first term 9 and common difference 10.

3. The HCF and LCM of two numbers are 9 and 360 respectively. If one number is 45, write the other number.

(1)

4. Find the value of k , for which one root of the quadratic equation $kx^2 - 14x + 8 = 0$ is 2. (1)
5. A ladder 15 m long makes an angle of 60° with the wall. Find the height of the point where the ladder touches the wall. (1)

OR

If $\sec \theta = \frac{25}{7}$, find the values of $\tan \theta$.

6. Find the area of a triangle formed by the points $A(5, 2)$, $B(4, 7)$ and $C(7, -4)$. (1)

Section B

Question numbers 7 to 12 carry 2 marks each.

7. A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two-digit number (ii) a perfect square number. (2)
8. If the points $A(6, 1)$, $B(8, 2)$, $C(9, 4)$ and $D(p, 3)$ are the vertices of a parallelogram, taken in order, find the value of p . (2)
9. Which term of the AP 21, 42, 63, 84, ... is 420? (2)
10. Two alarm clocks ring their alarms at regular intervals of 50 seconds and 48 seconds if they first beep together at 12 noon, at what time will they beep again? (2)

OR

Write whether every positive integer can be of the form $4q + 2$, where q is an integer. Justify.

11. Solve for x and y : $2x - 3y = 7$; $5x + 2y = 10$ (2)

OR

Find the value of m for which the pair of linear equations $2x + 3y - 7 = 0$ and $(m - 1)x + (m + 1)y = (3m - 1)$ has infinitely many solutions. (2)

12. One card is drawn from a well-shuffled deck of 52 cards. Calculate the probability that the card will be (i) an ace (ii) not be an ace. (2)

Section C

Question numbers 13 to 22 carry 3 marks each.

13. Prove that $\sin \theta (1 + \tan \theta) + \cos \theta (1 + \cot \theta) = \sec \theta + \operatorname{cosec} \theta$. (3)

OR

Prove that $(\operatorname{cosec} A - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$

14. Show whether $\frac{2\sqrt{45} + 3\sqrt{20}}{2\sqrt{5}}$ on simplification the answer is a rational or an irrational number. (3)

15. If -1 and 2 are two zeroes of the polynomial $2x^3 - x^2 - 5x - 2$, find its third zero. (3)

OR

If a polynomial $x^4 - 3x^3 - 6x^2 + kx - 16$ is exactly divisible by $x^2 - 3x + 2$, then find the value of k .

16. Find the coordinates of the points of trisection (i.e., points dividing in three equal parts) of the line segment joining the points $A(2, -2)$ and $B(-7, 4)$. (3)

OR

Show that $\triangle ABC$ with vertices $A(-2, 0)$, $B(0, 2)$ and $C(2, 0)$ is similar to $\triangle DEF$ with vertices $D(-4, 0)$, $F(4, 0)$ and $E(0, 4)$.

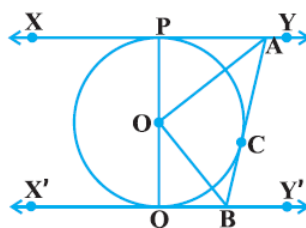
17. A well of diameter 3 m is dug 14 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 4 m to form an embankment. Find the height of the embankment. (3)

OR

Selvi's house has an overhead tank in the shape of a cylinder. This is filled by pumping water from a sump (an underground tank) which is in the shape of a cuboid. The sump has dimensions 1.57 m \times 1.44 m \times 95 cm. The overhead tank has its radius 60 cm and height 95 cm. Find the height of the water left in the sump after the overhead tank has been completely filled with water from the sump which had been full. Compare the capacity of the tank with that of the sump. (Use $\pi = 3.14$)

18. Prove that in a right angled triangle square of the hypotenuse is equal to sum of the squares of other two sides. (3)

19. In the figure, XY and $X'Y'$ are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and $X'Y'$ at B . Prove that $\angle AOB = 90^\circ$.

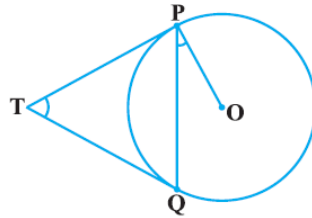


(3)

20. The table below gives the percentage distribution of female teachers in the primary schools of rural areas of various states and union territories (U.T.) of India. Find the mean percentage of female teachers. (3)

Percentage of female teachers	15 - 25	25 - 35	35 - 45	45 - 55	55 - 65	65 - 75	75 - 85
Number of States/U.T.	6	11	7	4	4	2	1

21. The numerator of a fraction is one less than its denominator. If three is added to each of the numerator and denominator, the fraction is increased $\frac{3}{28}$ by . Find the fraction. (3)
22. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2 \angle OPQ$. (3)



Section D

Question numbers 23 to 30 carry 4 marks each

23. Draw graphs of the equations:

$$4x - y - 8 = 0 \text{ and } 2x - 3y + 6 = 0$$

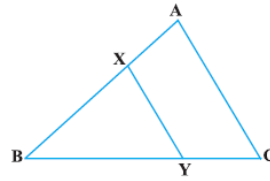
Also, determine the vertices of the triangle formed by the lines and x-axis. (4)

OR

Water is flowing at the rate of 15 km per hour through a pipe of diameter 14cm into a rectangular tank which is 50 m long and 44 m wide. Find the time in which the level of water in the tank will rise by 21 cm.

24. In an AP, the sum of first ten terms is -150 and the sum of its next ten terms is -550 . Find the AP. (4)
25. If $2 \cos \theta - \sin \theta = x$ and $\cos \theta - 3 \sin \theta = y$, prove that $2x^2 + y^2 - 2xy = 5$. (4)

26. In the figure, the line segment XY is parallel to side AC of $\triangle ABC$ and it divides the triangle into two parts of equal areas. Find the ratio $\frac{AX}{AB}$. (4)



27. A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope. Find (4)
- the area of that part of the field in which the horse can graze.
 - the increase in the grazing area if the rope were 10 m long instead of 5 m. (Use $\pi = 3.14$)
28. Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle. (4)

OR

Draw two concentric circles of radii 3 cm and 5 cm. Taking a point on the outer circle, construct the pair of tangents to the inner circle.

29. From the top of a 7 m high building, the angle of elevation of the top of a tower is 60° and the angle of depression of its foot is 45° . Find the height of the tower. [Use $\sqrt{3} = 1.732$] (4)
30. The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is ₹18. Find the missing frequency f . (4)

Daily pocket allowance (in ₹)	11 - 13	13 - 15	15 - 17	17 - 19	19 - 21	21 - 23	23 - 25
Number of children	7	6	9	13	f	5	4

OR

The given distribution shows the number of runs scored by some top batsmen of the world in one-day international cricket matches. Find the mode of the data.

Runs scored	Number of batsmen
3000 - 4000	4
4000 - 5000	18
5000 - 6000	9
6000 - 7000	7
7000 - 8000	6
8000 - 9000	3
9000 - 10000	1
10000 - 11000	1