

**PREBOARD EXAMINATION – 2020-21**

**Class: IX (CBSE)**

**Date.....**

**SUBJECT-MATHEMATICS**

**Total Marks: 80**

**Time: 3 hrs.**

**General Instructions:**

1. This question paper contains two parts A and B.
2. Both Part A and Part B have internal choices.

**Part – A:**

1. It consists three sections- I and II.
2. Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.
3. Section II has 4 questions on case study. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of 5 sub-parts.

**Part – B:**

1. Question No 21 to 26 are Very short answer Type questions of 2 mark each,
2. Question No 27 to 33 are Short Answer Type questions of 3 marks each
3. Question No 34 to 36 are Long Answer Type questions of 5 marks each.
4. Internal choice is provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks.

**PART A**

**SECTION I**

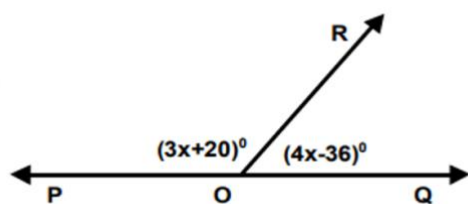
*Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.*

- |   |  |   |
|---|--|---|
| 1 | The exponent form of $\sqrt[3]{7}$ is  | 1 |
| 2 | If $m$ and $n$ are two natural numbers and $m^n = 32$ , then $n^{mn}$ is ..... | 1 |
| 3 | If $a = 2$ and $b = 3$ , then the value of $(a^b + b^a)^{-1}$ is :             | 1 |

**OR**

Find the value of the polynomial  $6t^2 + 7t - 3$  when  $t = -1$  .

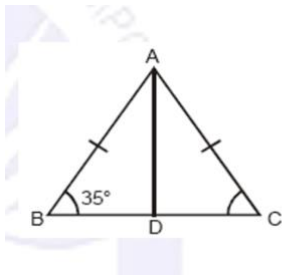
- |   |   |   |
|---|---|---|
| 4 | Write the degree of the polynomial $\sqrt{2}$ . | 1 |
| 5 | In the adjoining figure, find the value of $x$  | 1 |



- |   |   |   |
|---|---|---|
| 6 | Find the semi perimeter of a triangle with sides 9 cm, 12 cm and 30 cm. | 1 |
|---|---|---|

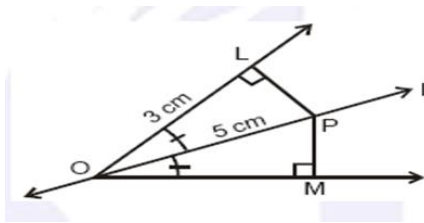
- 7 In the given figure, AD is the median ,then find  $\angle BCA$  .

1



**OR**

In the given figure  $\triangle PLO \cong \triangle PMO$ , Find the length of PM.

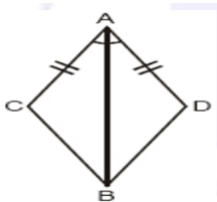


- 8 The area of a triangle is  $48\text{cm}^2$ . Its base is 12cm , Find its altitude.

1

- 9 In the given figure the congruency rule used in providing  $\triangle ACB \cong \triangle ADB$  is .....

1



- 10 There are 5 red and 3 black balls in a bag. Find the probability of drawing a black ball.

1

- 11 The two angles measuring  $(30^\circ - a)$  and  $(125^\circ + 2a)$  are supplementary to each other, then the value of 'a' is:

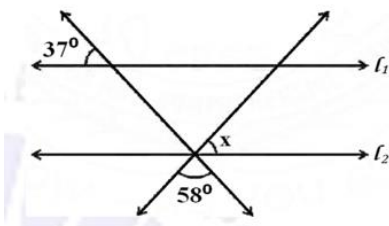
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**OR**

What is the measure of an angle whose measure is  $32^\circ$  less than its supplement?

- 12 In the figure  $l_1 \parallel l_2$ , What is the value of  $x$ ?

1



**OR**

Angles of a triangle are in the ratio 2 : 4 : 3, Find the smallest angle of the triangle.

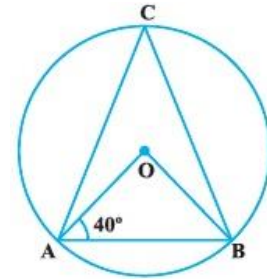
- 13 In parallelogram ABCD,  $m\angle A = (5x - 20)^\circ$  and  $m\angle C = (3x + 40)^\circ$ . Find the value of  $x$ .

1

OR

If the degree measures of the angles of the quadrilateral are  $4x$ ,  $7x$ ,  $9x$  and  $10x$ , What is the measure of the smallest angle and the largest angle?

- 14 The sum of either pair of opposite angles of a cyclic quadrilateral is \_\_\_\_\_ 1
- 15 The radius of the circle is 5 cm and the distance of the chord from the Centre of the circle is 4 cm then, the length of the chord is..... 1
- 16 In the figure, if  $\angle OAB = 40^\circ$  then,  $\angle ACB$  is equal to 1



## SECTION II

Case study based questions are compulsory. Attempt four **sub parts** of each question. **Each subpart carries 1 mark.**

### 17 Case Study based-1

Two classmates Salma and Anil simplified Two different expressions during the revision hour and explained to each other their simplifications. 4

Salma explains simplification of  $\frac{\sqrt{2}}{\sqrt{5}+\sqrt{3}}$  by rationalising the denominator and Anil explains simplifications of  $(\sqrt{2} + \sqrt{3})(\sqrt{2} - \sqrt{3})$  by using the identity  $(a + b)(a - b)$ . Answer the following question.

1. What is the conjugate of  $\sqrt{5} + \sqrt{3}$ .

- a)  $\sqrt{5} + \sqrt{3}$
- b)  $\sqrt{5} - \sqrt{3}$
- c)  $\sqrt{5} \times \sqrt{3}$
- d)  $\frac{\sqrt{5}}{\sqrt{3}}$

2. By rationalising the denominator of  $\frac{\sqrt{2}}{\sqrt{5}+\sqrt{3}}$  Salma got the answer:

- a)  $\frac{\sqrt{2}}{\sqrt{5}-\sqrt{3}}$
- b)  $\frac{\sqrt{2}(\sqrt{5}-\sqrt{3})}{2}$
- c)  $\sqrt{5} - \sqrt{3}$
- d)  $\frac{\sqrt{2}(\sqrt{5}+\sqrt{3})}{2}$

3. Anil applied ..... identity to solve  $(\sqrt{5} + \sqrt{7})(\sqrt{5} - \sqrt{7})$

- a)  $(a + b)(a + b)$
- b)  $(a + b)(a - b)$
- c)  $(a - b)(a - b)$
- d)  $(x+a)(x+b)$

4.  $(\sqrt{2} + \sqrt{3})(\sqrt{2} - \sqrt{3}) = \dots\dots\dots$

- a) -1
- b) 1
- c) 5
- d) -5

5. Addition of two irrational numbers is equal to .....

- a) Rational
- b) Irrational
- c) Integers
- d) Whole Number

18. **Case Study based-2**

4

Four friends Ram, Raju, Ravi, Ritu are standing in reference to a well situated at the origin with the following respective coordinates (2,4), (-2,4), (-2, -4) and (2, -4).

1. By plotting this points on a single graph paper, the figure obtained is rectangle. find the perimeter of the rectangle.

- a) 12cm
- b) 24cm
- c) 48cm
- d) 8cm

2. Find the distance between Ram and Raju

- a) 2 cm
- b) 3 cm
- c) 4 cm
- d) 5 cm

3. Raju stands on which quadrant.

- a) Quadrant I
- b) Quadrant II
- c) Quadrant III
- d) Quadrant IV

4. Ordinate of (2, -4)

- a) -4
- b) -2
- c) 4
- d) 2

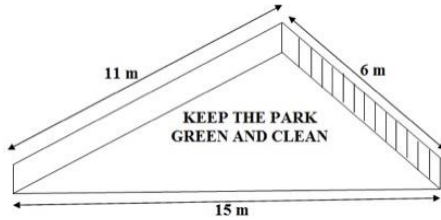
5. Abscissa of (-2, -4)

- e) -4

- f) -2
- g) 4
- h) 2

19. **Case study based 3**

There is a slide in a park. One of its side walls has been painted in some colour with a message "Keep the park clean and green". The sides of the wall are 11m, 15m and 6m. 4



1. The semi perimeter of the triangle is

- a) 30m
- b) 16m
- c) 32m
- d) 15m

2. Formula to find perimeter of the triangle is

- a)  $\frac{a + b + c}{2}$
- b)  $a + b + c$
- c)  $3a$
- d)  $2(a + b + c)$

3. Area of the triangle is

- a)  $15\text{m}^2$
- b)  $30\text{m}^2$
- c)  $20\sqrt{2}\text{m}^2$
- d)  $20\sqrt{3}\text{m}^2$

4. Formula to find area of the sidewall is

- a)  $\frac{1}{2}bh$
- b)  $\frac{\sqrt{3}}{4}a^2$
- c)  $\sqrt{s(s - a)(s - b)(s - c)}$
- d)  $a + b + c$

5. Perimeter of the triangle is

- a) 16m
- b) 32m

- c) 30m
- d) 20m

20. **Case study based 4**

The daily cost of milk supplied to 25 houses in a locality are given below

4

Cost	Number of Houses
40 - 50	4
50 - 60	5
60 - 70	3
70 - 80	5
80 - 90	2
90 - 100	6

If one house is chosen at random, find

1. Probability (The milk bill of the house lies in ₹ 60 - ₹80) is

- a)  $\frac{3}{25}$
- b)  $\frac{8}{25}$
- c)  $\frac{5}{25}$
- d)  $\frac{25}{8}$

2. Probability (House is paying less than ₹ 70 for the milk bill) is

- a)  $\frac{5}{25}$
- b)  $\frac{8}{25}$
- c)  $\frac{12}{25}$
- d)  $\frac{4}{25}$

3. Probability (The mil bill of the house is below ₹ 50)

- a)  $\frac{5}{25}$
- b)  $\frac{8}{25}$
- c)  $\frac{12}{25}$
- d)  $\frac{4}{25}$

4. Probability (The milk bill of the house is above ₹ 100)

- a) 0
- b) 1
- c)  $\frac{12}{25}$
- d)  $\frac{4}{25}$

5. Probability (The milk bill of the house lies between ₹40 - ₹100)

- 1. 0
- 2. 1

3.  $\frac{12}{25}$   
 4.  $\frac{4}{25}$

**PART B**

*Question number 21-26 carries 2 mark each. Internal choice provided in 2 questions*

21. If  $P(x) = x^3 - 1$ , then the value of  $P(1) + P(-1)$  is ----- 2
22. Express  $0.4777\dots$  in the form of  $\frac{p}{q}$ , where  $p$  and  $q$  are integers and  $q \neq 0$ . 2

**OR**

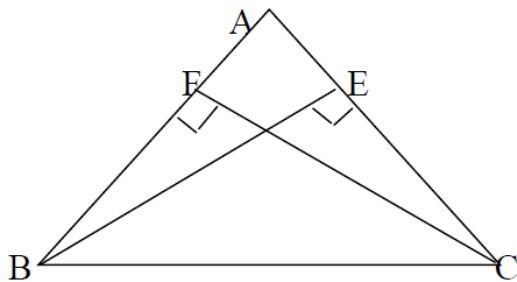
Simplify :  $\left(8^{\frac{1}{3}} + 27^{\frac{1}{3}}\right)$

23. Write the factors of the polynomial  $4x^2 + y^2 + 4 + 4xy + 8x + 4y$  2
24. If the point  $(2k - 3, k + 2)$  is a solution of linear equation  $2x + 3y + 15 = 0$ , find the value of  $k$ . 2

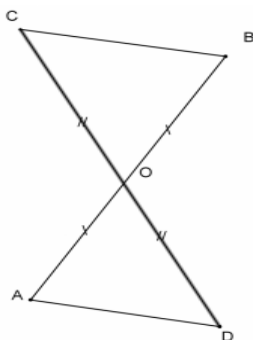
**OR**

The cost of a toy telephone is the same as cost of 3 balls. Express the statement as a linear equation in two variables.

25. ABC is an isosceles triangle in which altitudes BE and CF are drawn to equal sides AC and AB respectively. Show that these altitudes are equal 2

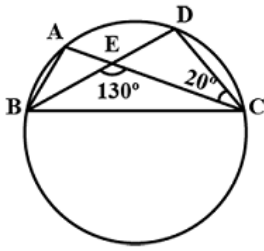


26. In the figure,  $OA = OB$ ,  $OD = OC$ , then choose the congruence rule by which  $\triangle AOD \cong \triangle BOC$ . 2

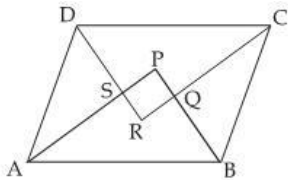


*Question number 27-33 carries 3 mark each. Internal choice provided in 2 questions*

27. In the figure A,B,C,D are four points on a circle. AC and BD intersect at a point E such that  $\angle BEC = 130^\circ$  and  $\angle ECD = 20^\circ$ . Find  $\angle BAC$ . 3



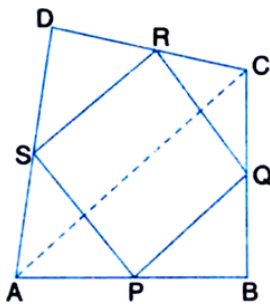
28. Examine which of the numbers 1, -1, -3 are zeroes of the polynomial  $p(x) = 2x^4 + 9x^3 + 11x^2 + 4x - 6$  3
29. Show that the bisectors of angles of a parallelogram form a rectangle. 3



OR

Prove that : "A diagonal of a parallelogram divides it in to two congruent triangles."

- 30 Prove that : "The sum of the angles of a triangle is  $180^\circ$ " 3
- 31 ABCD is a quadrilateral in which P,Q,R, and S are mid-points of the sides AB, BC, CD and DA. AC is a diagonal. Show that 3
- (i)  $SR \parallel AC$  and  $SR = \frac{1}{2} AC$
  - (ii)  $PQ = SR$
  - (iii) PQRS is a parallelogram.



OR

Show that : "If the diagonals of a quadrilateral bisect each other at right angles, then it is a rhombus."

- 32 Construct a right triangle  $\triangle XYZ$  in which  $\angle Z = 90^\circ$ ,  $YZ = 3\text{cm}$ ,  $XZ + XY = 5\text{cm}$  3
- 33 Find the volume of a sphere whose surface area is  $154\text{cm}^2$  3

**Question number 34-36 carries 5 mark each. Internal choice provided in 1 question.**



34. A cubical box has each edge 10cm and a cuboidal box is 10cm wide, 12.5cm long and 8cm high. 5
- (i) Which box has the greater lateral surface area and how much?  
(ii) Which box has the smaller total surface area and how much?

**OR**

- A conical tent is 10m high and the radius of its base is 24m. Find
- (i) slant height of the tent.  
(ii) Cost of the canvas required to make the tent, if the cost of  $1\text{m}^2$  canvas is ₹ 70
35. The following table shows the number of people of different age groups travelling in a metro during a day: Draw Histogram for the given data:

Age group (in years)	No. of people(in hundreds)
0-10	27
10-20	33
20-30	39
30-40	45
40-50	27
50-60	15

5

- 36 Draw the graph of the equation  $x - y = 4$  5

Answer the following using graph paper:

- (i) Find the value of  $y$ , if  $x = 7$  from the graph.  
(ii) Write the coordinate of the point where the graph intersect on  $x - axis$ .

**-END-**