BK BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS

SENIOR SECONDARY CO-ED DAY CUM BOYS' RESIDENTIAL SCHOOL

MID-TERM EXAMINATION 2024-25

MATHEMATICS (041)

Class : IX
Date : 14-09-2024
Admission No.:

Duration : 3 Hrs
Max. Marks : **80**
Roll No.:

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 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 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided.

SECTION A

1.The product of a rational and an irrational numbers is:

a) Always an integer b) Always a rational number c) Always an irrational number
d) Sometimes rational and sometimes irrational

2. The rational number $0.\overline{3}$ can also be written as

a) 0.3 (b) $\frac{3}{10}$ c) 0.30 d) $\frac{1}{3}$

3. What is the area of an equilateral triangle with side 2 cm?

a) $\sqrt{6}cm^2$ b) $\sqrt{3}cm^2$ c) $\sqrt{8}cm^2$ d) $4cm^2$

4. The sides of a triangle are 15 cm, 17 cm and 8 cm. What is its area?

a) $20cm^2$ b) $40cm^2$ c) $60cm^2$ d) $80cm^2$

5. The zeroes of $x^2 - 2x - 8$ are:

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

6. When $x = 1$, which of the following is the value of $p(x) = 5x - 4x^2 + 3$?

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

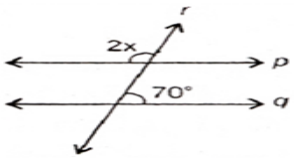
7. What kind of polynomial is $1 + 3x$?

a) Quadratic b) Cubic c) Linear d)None of the these

8. When two lines intersect with each other, the vertically opposite angles formed are:

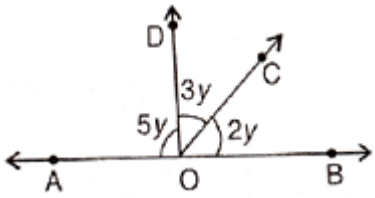
a) Unequal b) Equal c) Cannot be determined d) None of the these

9. In the figure, $p \parallel q$. The value of x is:



a) 35^o b) 55^o c) 70^o d) 110^0

10. If AOB is a line then the measure of ∠BOC, ∠COD and ∠DOA respectively in the given figure, are:



a) 36°, 54°, 90° b)90°, 54°, 36° c) 90°, 36°, 54° d)36°, 90°, 54°

11. The points (–4,–8) lies in:

a) First quadrant b) Second quadrant c) Third quadrant d) Fourth quadrant

12. If the coordinates of the two points are P (–7, 5) and Q (–6, 9), then (abscissa of P) – (abscissa of Q) is

a) –3 b) 1 c) –2 d) –1

13. When $x = 3$ and y = -2 then solution of the equation $4px - 3y = 12$, the value of p is

a) 0 b) $\frac{1}{2}$ c) 2 d) 3

14. How many linear equation in x and y can be satisfied by $x = 1$ and $y = 2$

a) only one b) two c) infinitely many d) three

15. Cost of book (x) exceeds twice the cost of pen (y) by Rs 10 . This can be expressed as linear equation in two variables as

a) $x - 2y - 10 = 0$ b) $2x - y - 10 = 0$ c) $2x + y - 10 = 0$ d) $x - 2y + 10 = 0$

16. What is the total surface area of a hemisphere of radius r?

a) $4\pi r^2$ b) πr^2 c) $2\pi r^2$ d) $3\pi r^2$

17. If the radius of a sphere is doubled, then what is the ratio of their surface area?

a) 1 : 2 b) 2 : 1 c) 1 : 4 d) 8 : 1

18. The surface area of a sphere of radius 21 cm is: (Assume $\pi = 22/7$)

a) 1386 sq.cm b) 1400 sq.cm c) 5544 sq.cm d) 2000 sq.cm

19. **Assertion:** y^2-5 is a quadratic polynomial.
Reason: degree of polynomial 2 is called quadratic polynomial.
a.) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion
b.) Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.
c.) Assertion is true but the reason is false.
d.) Both assertion and reason are false.

20. **Assertion: :** A point whose abscissa is 2 and ordinate is -3 lies in fourth quadrant
Reason: Points of the type (-- , +) lie in the second quadrant
a.) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion
b.) Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.
c.) Assertion is true but the reason is false.
d.) Both assertion and reason are false.

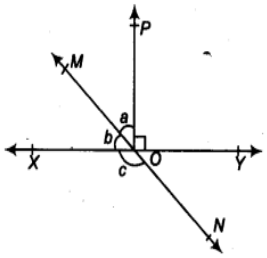
SECTION B

21. Simplify: $2^{2/3} \times 2^{1/3}$
22. Expand : $(4a - 2b - 3c)^2$

OR

Evaluate using suitable identity : $(104)^2$

23. In figure, lines XY and MN intersect at 0. If ∠POY = 90° , and a : b = 2 : 3. find c.



24. Find out the value of k, if x = 5, y = -1 is a given solution of the equation 2x + 3y = k.
25. Find the radius of the sphere whose surface are is 154 sq.cm.

OR

A right triangle ABC with sides 5 cm, 12 cm and 13 cm. is revolved about 12 cm. Find the volume of the solid so obtained.

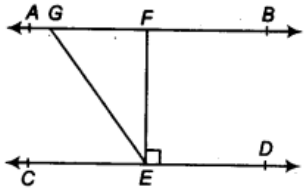
SECTION C

26. Rationalise the denominator and simplify: $\frac{5+\sqrt{6}}{5-\sqrt{6}}$
27. Find the area of an isosceles triangle each of whose equal sides is 13 cm , and whose base is 24 cm.
28. Factorise : $6x^2 + 5x - 6$

OR

Factorise : i) $x^2 - \frac{y^2}{100}$ ii) $\frac{25}{4} - \frac{y^2}{9}$

29. if AB || CD, EF ⊥ CD and ∠GED = 126°, find ∠AGE, ∠GEF and ∠FGE.



OR

It is given that ∠XYZ = 64° and XY is produced to point P. Draw a figure from the given information. If ray YQ bisects ∠ZYP, find ∠XYQ and reflex ∠QYP.

30. In which quadrant or on which axis do the following points lie?

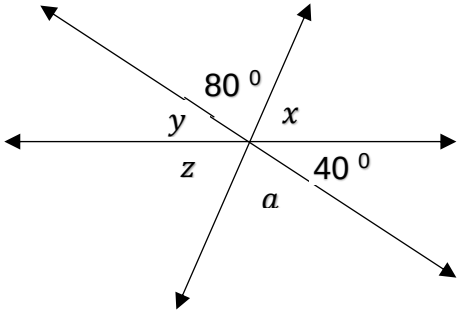
(-2 , 4) , (3 , - 1) , (4 , 4) , (-1 , 0) , (-1 , -1) and (0 , 10)

31. Find six solution of : 2 x + y = 12

SECTION D

32. A triangular park has sides 120 m, 80 m and 50 m. Find its area.

33. Find x , y , z and a using the below given figure.



34. Draw the graph of : $2x - y = 4$

OR

Plot each of the points : A(-2 , 4) , B(-2 , -3) , C(4 , -3) , D (4 ,4) .

Join segments AB , BC , CD and DA. Name the so obtained figure.

Write the coordinates of the point where segment CD cuts $x - axis$

35. The volume of a right circular cone is 9856 cm ^{3} . If the diameter of the base is 28 cm . Find : i) height of the cone ii) slant height of the cone.

OR

The diameter of the moon is approximately one- fourth of the diameter of the earth. Find the ratio of their surface areas.

SECTION E

36. According to a data, around one and a half lakh persons die due to road accident per year in India. According to a research, mostly accidents occur due to ignorance of traffic rules. To spread awareness about traffic rules, B K Birla School initiated a step in this matter and provided all schools of Pune the traffic signal board, indicating “SCHOOL AHEAD” is an equilateral triangle with side ‘**a**’.

(i) What is semi perimeter of the triangle? 1

(ii) If the perimeter of the triangle is 180 cm, then find the side of the triangle. 2

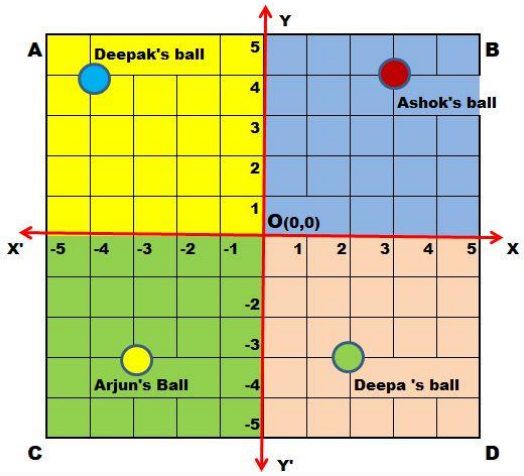
(iii) Write the formula to find area of the equilateral triangle. 1

37. There is a square park ABCD in the middle of Saket colony in Surat. Four children Deepak, Ashok, Arjun and Deepa went to play with their balls. The colour of the ball of Ashok, Deepak, Arjun and Deepa are red, blue, yellow and green respectively.
All four children roll their ball from centre point O in the direction of **XOY, X'OY, X'OY' and XOY'**. Their balls stopped as shown in the following image.
Answer the following questions:

i) What are the coordinates of the ball of Ashok? 2

ii) What the line XOX' is called? 1

iii) What is the ordinate of the ball of Arjun? 1



38. Once four friends Rahul, Arun, Ajay and Vijay went for a picnic at a hill station. Due to peak season, they did not get a proper hotel in the city. The weather was fine so they decided to make a conical tent at a park. They were carrying 300 m² cloth with them. As shown in the figure they made the tent with height 8 m and diameter 12 m. The remaining cloth was used for the floor.

Using the above figure, answer the following.

i) Find the slant height. 1

ii) Find the curved surface area of tent. 2

iii) Write the formula to calculate the volume of the tent. 1

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