

**Kendriya Vidyalaya Sangathan, Lucknow Region**  
**Session Ending Exam 2022-23**  
**Class IX Subject Mathematics**

**Time Allowed: 3 Hours**

**Maximum Marks: 80**

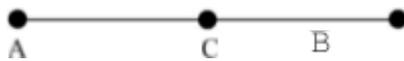
**General Instructions:**

1. This question paper consists of 5 Sections A, B, C, D and E.
2. Section A consists of 20 MCQs carrying 1 mark each.
3. Section B consists of 5 questions carrying 2 marks each.
4. Section C consists of 6 questions carrying 3 marks each.
5. Section D consists of 4 questions carrying 5 marks each.
6. Section E consists of 3 Case Based Integrated Units of Assessment (4 marks each).
7. All questions are compulsory. However, an internal choice in 2 questions of 5 marks, 2 questions of 3 marks and 2 questions of 2 marks has been provided.
8. Draw neat figures wherever required. Take  $\pi$  as  $\frac{22}{7}$  wherever required if not stated.

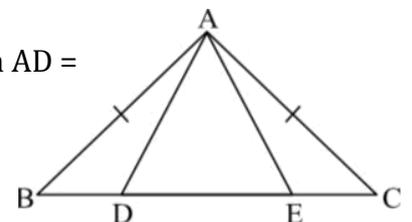
**SECTION A**

**Section A consists of 20 questions of 1 mark each.**

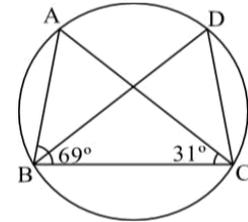
1. The product of  $(\sqrt{5} - \sqrt{2})(\sqrt{5} + \sqrt{2})$  is  
a) Rational    b) Irrational    c) infinite    d) none of these
2. The value of  $125^{\frac{-1}{3}}$  is  
a)  $\frac{1}{125}$     b)  $\frac{1}{15}$     c)  $\frac{1}{5}$     d)  $\frac{1}{25}$
3. Product of  $(x - 3)(x + 5)$  is  
a)  $x^2 + 2x - 15$     b)  $x^2 - 2x - 15$     c)  $x^2 + 2x + 15$     d)  $x^2 - 2x + 15$
4. If  $p(t) = 2 + t + 2t^2 - t^3$ , then  $p(1)$  is  
a) 4    b) -5    c) 5    d) 0
5. The value of  $k$ , if  $x=2$ ,  $y=-1$  is a solution of  $2x + 3y = k$   
a) -1    b) 2    c) 0    d) 1
6. Which of the following is solution of  $x - 2y = 4$   
a) (0,2)    b) (2,0)    c) (4,0)    d) (1,1)
7. If a point C lies between two points A and B such that  $AC = BC$ , then



- a)  $AC=AB$     b)  $AC= \frac{1}{2} AB$     c)  $AB = \frac{1}{2} AC$     d)  $AC = \frac{1}{4} AB$
8. If one angle is 4 times its supplement, then the angles are  
a)  $36^\circ, 140^\circ$     b)  $30^\circ, 150^\circ$     c)  $36^\circ, 144^\circ$     d)  $40^\circ, 140^\circ$
9. In the given figure  $AB=AC$  and  $BE = CD$ . If  $\Delta ACD \cong \Delta ABE$  then  $AD =$   
a) AC    b) AB    c) AE    d) BE



10. The consecutive angles of a parallelogram are  
 a) Complementary b) supplementary c) equal d) none of these
11. If in a parallelogram diagonals are equal and bisect each other at right angles , then it is  
 a) Square b) rectangle c) rhombus d) parallelogram
12. A chord 6 cm long is drawn in a circle with a diameter equal to 10 cm, then its perpendicular distance from centre, is  
 a) 4cm b) 5 cm c) 6cm d) 7 cm
13. In the given figure  $\angle ABC = 69^\circ$ ,  $\angle ACB = 31^\circ$ , find  $\angle BDC$   
 a)  $60^\circ$  b)  $90^\circ$  c)  $80^\circ$  d)  $100^\circ$
14. Area of equilateral triangle with side  $2\sqrt{3}$  cm is  
 a)  $4\text{ cm}^2$  b)  $4\sqrt{3}\text{ cm}^2$  c)  $3\sqrt{3}\text{ cm}^2$  d)  $5\text{ cm}^2$
15. The total surface area of cone whose radius is r and slant height is l is  
 a)  $2\pi r(l + r)$  b)  $\pi r(l + r)$  c)  $\pi r(l + 2r)$  d)  $2\pi r(l + 2r)$
16. If radius of sphere is  $2r$  , then it's volume will be  
 a)  $\frac{4}{3}\pi r^3$  b)  $4\pi r^3$  c)  $\frac{8}{3}\pi r^3$  d)  $\frac{32}{3}\pi r^3$
17. The class mark and class size of a class interval are 12.5 and 5 respectively, then the class Interval is  
 a) 10 – 15 b) 12 – 13 c) 11 – 14 d) 8 – 13
18. In the class intervals 15—25, 25—35, the number 25 is included in  
 a) 15—25 b) 25—35 c) both the interval d) none of the interval



**Direction:** In the question number 19 and 20, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option:

19. **Assertion (A):** In triangle ABC and PQR if  $\angle A = \angle P$  ,  $\angle C = \angle R$  and  $AC = PR$ , then the two triangles are congruent by ASA congruence.

**Reason (R):** If two angles and included side of a triangle are equal to the corresponding angles and side of the other triangle , then the triangles are congruent by ASA congruence

- (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)  
 (b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)  
 (c) Assertion (A) is true but reason (R) is false  
 (d) Assertion (A) is false but reason (R) is true
20. **Assertion (A) :** The degree of polynomial  $(x-2)(x-3)(x-4)$  is 4

**Reason (R):** A polynomial with degree **n** can have maximum **n** number of zeroes.

- (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)
- (b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)
- (c) Assertion (A) is true but reason (R) is false
- (d) Assertion (A) is false but reason (R) is true

### SECTION B

**Section B consists of 5 questions of 2 marks each.**

21. Simplify:  $\frac{11^{1/3}}{11^{1/4}}$

**OR**

Simplify:  $(\sqrt{3} + \sqrt{7})^2$

22. If the point (3,4) lies on the graph of the equation  $3y = ax + 7$ . Find the value of a

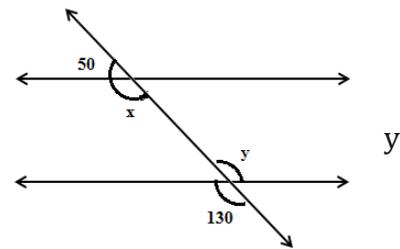
23. The taxi fare in a city is as follows :

For the first kilometer, the fare is Rs 8 and for the subsequent distance it is Rs 5 per km. Taking the distance covered as x km and total fare is Rs y, write a linear equation .

24. Find the curved surface area of cone whose slant height is 20 cm and base radius is 12 cm.

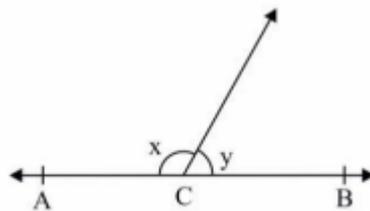
(Take  $\pi = 3.14$ )

25. In the given figure AB || CD. Find the value of x and



**OR**

In the given figure AB is a straight line and  $x:y = 2:1$ . Find the value of x and y



### SECTION C

**Section C consists of 6 questions of 3 marks each**

26. Express  $0.\overline{47}$  in the form of  $p/q$ , where p and q are integers and  $q \neq 0$

27. If  $x = 2 - \sqrt{3}$ , then find the value of  $x + \frac{1}{x}$

28. If  $a + b + c = 4$  and  $a^2 + b^2 + c^2 = 14$ , find  $ab + bc + ca$

29. a) Expand:  $(2x - y + z)^2$

b) Evaluate using identity:  $(98)^3$

**OR**

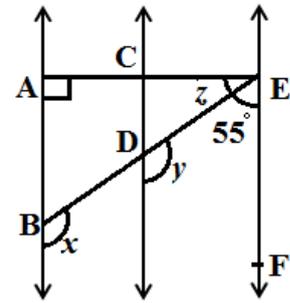
a) Factorize :  $27y^3 - 125z^3$

b) Without actually calculating the cubes , find the value of

$$(-12)^3 + 7^3 + 5^3$$

30. In the given figure  $AB \parallel CD$ , and  $CD \parallel EF$ . Also  $EA \perp AB$ .

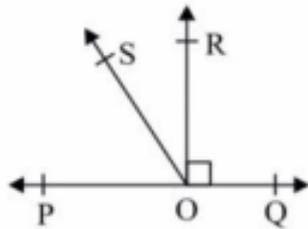
If  $\angle BEF = 55^\circ$  , find the value of  $x$  ,  $y$  and  $z$



**OR**

In the figure  $POQ$  is a line. Ray  $OR$  is perpendicular to line  $PQ$ .  $OS$  is another ray lying between rays  $OP$  and  $OR$ . Prove that

$$\angle ROS = \frac{1}{2} (\angle QOS - \angle POS)$$



31. A triangular park in a city has dimensions 30 m, 26m and 28 m. A gardener has to plant grass inside it at Rs 1.50 per meter square. Find the amount to be paid to the gardener.

**SECTION D**

**Section consists of 4 questions of 5 marks each**

32. a) Find the value of  $k$  , if  $(x-1)$  is a factor of  $p(x)=2x^2 + kx + \sqrt{2}$  ( 2 Marks)

b) Factorize:  $x^3 + 13x^2 + 32x + 20$  ( 3 Marks)

33. In parallelogram  $ABCD$ , two points  $P$  and  $Q$  are taken on diagonal  $BD$  such that  $DP=BQ$ .

Show that

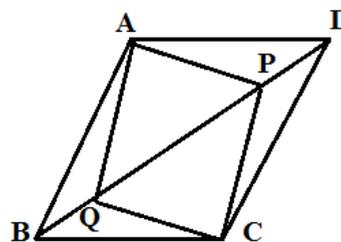
i)  $\triangle APD \cong \triangle CQB$

ii)  $AP = CQ$

iii)  $\triangle AQB \cong \triangle CPD$

iv)  $AQ = CP$

v)  $APCQ$  is a parallelogram

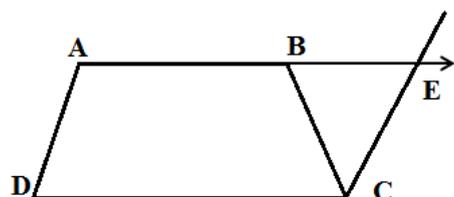


**OR**

$ABCD$  is a trapezium in which  $AB \parallel CD$  and  $AD = BC$  in the given figure. Show that

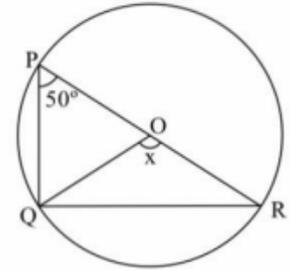
i)  $\angle A = \angle B$

ii)  $\angle C = \angle D$



- iii)  $\Delta ABC \cong \Delta BAD$
- iv) Diagonal AC = Diagonal BD

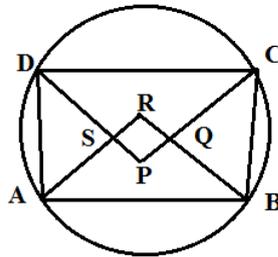
34. (a) Prove that the angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle. (4 Marks)



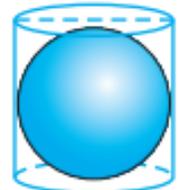
(b) Using the above theorem, find the value of x in the given figure. (1 Marks)

**OR**

In figure ABCD is a cyclic quadrilateral. DP, CP, BR, AR are angle bisectors. Prove that the quadrilateral formed by angle bisectors i.e. PQRS is also cyclic.



35. (a) A right circular cylinder just encloses a sphere of radius r. Find
- i) Surface area of sphere (3 Marks)
  - ii) Curved surface area of cylinder
  - iii) Ratio of the area obtained in (i) and (ii)

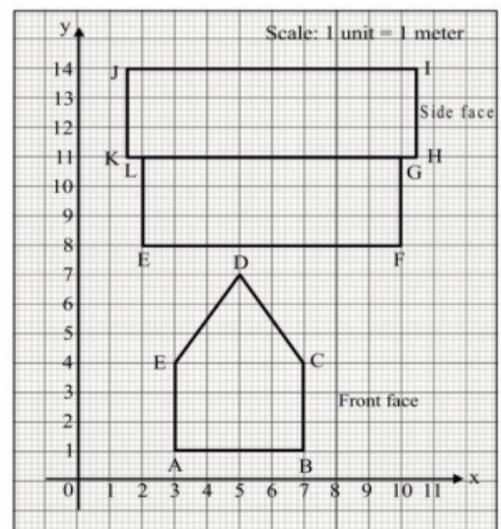


(b) Find the amount of water displaced by a solid spherical ball of diameter 0.21 m. (use  $\pi = \frac{22}{7}$ ) (2 Marks)

**SECTION E**

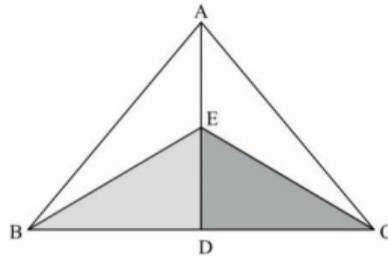
**Case study based questions**

36. Side and front face of the house are plotted on the graph sheet.



- a) Find the coordinate of the points A and B.
- b) Mention the points with coordinate (2,11) and (7,4)
- c) Area of rectangle EFGL.

37. During a Rangoli competition Ananya made a geometrical Rangoli as shown below:



On measuring the dimensions it was found that AB and AC are equal and BE and CE are also equal.

- a) Which side is common in triangles AEB and AEC
  - b) Are triangles ABE and ACE congruent?
  - c) Show that  $\angle BED = \angle CED$ .
38. Consider the marks, out of 100, obtained by 51 students of a class in a test , given below:

Marks	Number of students
0 - 10	5
10 - 20	10
20 - 30	4
30 - 40	6
40 - 50	7
50 - 60	3
60 - 70	2
70 - 80	2
80 - 90	3
90 - 100	9
<b>Total</b>	<b>51</b>

- a) How many students obtained marks more than 70?
- b) What is the class mark of the interval in which most of the students lie?
- c) Draw a frequency polygon corresponding to this frequency distribution table.