



HANSRAJ PUBLIC SCHOOL  
SECTOR-6, PANCHKULA  
CLASS- IX, Half Yearly Exam (2025-26)  
SUBJECT- MATHEMATICS

Date-24.09. 2025  
Time: 3 hours

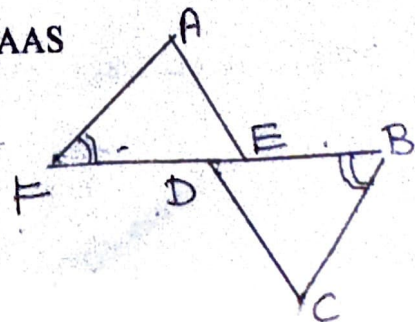
Roll No. 22  
Maximum Marks: 80

General Instruction: —

- 1) This question paper has 5 sections A – E.
- 2) Section A has 20 MCQ's carrying 1 mark each.
- 3) Section B has 5 questions carrying 2 marks each.
- 4) Section C has 6 questions carrying 3 marks each.
- 5) Section D has 4 questions carrying 5 marks each.
- 6) Section E has 3 case-based questions carrying 4 marks each.

SECTION – A

1. The abscissa of a point is the distance of the point from  
a) origin                      b) x-axis                       c) y-axis                      d) none of these
2. The perimeter of an equilateral triangle is 90m. Its area is ....  
a)  $10\sqrt{3} \text{ m}^2$                        b)  $225\sqrt{3} \text{ m}^2$                       c)  $15\sqrt{3} \text{ m}^2$                       d)  $20\sqrt{3} \text{ m}^2$
3. Write the degree of the polynomial  $(3x - 7)(4x + 2x^2)$   
a) 2                       b) 3                      c) 4                      d) 5
4. The angle which is half of its supplement is.....  
a)  $50^\circ$                       b)  $70^\circ$                        c)  $60^\circ$                       d)  $100^\circ$
5. The perpendicular distance of a point Q from the x-axis is 4 units and the perpendicular distance from y-axis is 5 units. Write the coordinates of the point Q if it lies in the 3<sup>rd</sup> quadrant.  
a) (-4, -5)                       b) (-5, -4)                      c) (-4, 5)                      d) (-5, 4)
6. If  $x = 9 - 4\sqrt{5}$ , then the value of  $x^2 + 1/x^2$  is.....  
a) 320                      b) 321                       c) 322                      d) 325
7. On dividing  $x^3 + 3x^2 + 3x + 1$  by  $5 + 2x$  we get remainder  
a)  $\frac{8}{27}$                       b)  $\frac{27}{8}$                        c)  $\frac{-27}{8}$                       d)  $\frac{-8}{27}$
8. If  $\sqrt{3} = 1.732$  and  $\sqrt{2} = 1.414$ , then the value of  $\frac{1}{\sqrt{3}-\sqrt{2}}$  is.....  
a) 0.318                       b) 3.146                      c)  $\frac{1}{0.318}$                       d)  $\sqrt{1.732} - \sqrt{1.414}$
9. An isosceles right triangle has an area of  $200\text{cm}^2$ . What is the length of its hypotenuse?  
 a)  $20\sqrt{2}\text{cm}$                       b) 10cm                       c)  $10\sqrt{2}\text{cm}$                       d)  $30\sqrt{2}\text{cm}$
10. What is the total surface area of a cone whose radius is  $r/2$  and slant height is 2l.  
a)  $2\pi r(1+r)$                        b)  $\pi r(1+r/4)$                       c)  $\pi r(1+r)$                       d)  $2\pi rl$
11. In the given figure,  $AF = BC$ ,  $EF = BD$  and  $\angle AFE = \angle CBD$ . Then the rule by which  $\triangle AFE \cong \triangle CBD$  is.....  
 a) SAS                      b) ASA                      c) SSS                      d) AAS

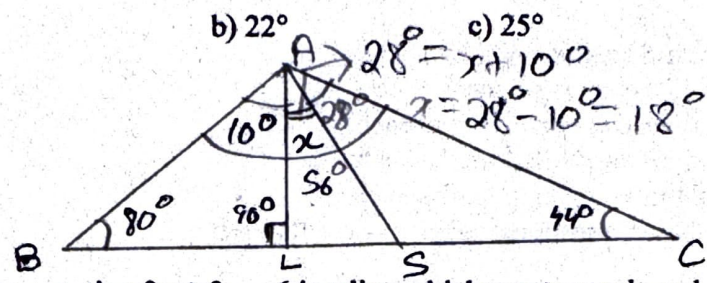




12. If (a, 4) lies on the graph of  $3x + y = 10$ , then the value of a is  
 a) 3                      b) 1                       c) 2                      d) 4

13. The equation  $x - 2 = 0$  on number line is represented by  
 a) a line                       b) a point                      c) infinitely many points                      d) none

14. In the given figure, if  $AL \perp BC$ , AS is the angle bisector of  $\angle A$ . Find x if  $\angle B = 80^\circ$  and  $\angle C = 44^\circ$   
 a)  18°                      b) 22°                      c) 25°                       d) 32°



15. The graph of the equation  $2x + 3y = 6$  is a line which meets x-axis and y-axis respectively at the points  
 a)  (3, 0) and (0, 2)                      b) (2, 0) and (0, 3)  
 c) (0, 3) and (2, 0)                      d) (3, 2) and (2, 3)

16. In  $\triangle ABC$ ,  $\angle A = 50^\circ$  and BC is produced to a point D. If the bisector of  $\angle ABC$  and  $\angle ACD$  meet at E, then  $\angle E = \dots$   
 a)  25°                      b) 50°                      c) 100°                      d) 75°

17. If the volume of two cones are in the ratio 1 : 4 and their diameters are in the ratio 4 : 5, then the ratio of their heights is...  
 a) 1 : 5                       b) 5 : 4                      c) 5 : 16                       d) 25 : 64

18. The factors of  $a^2 - 1 - 2x - x^2$  will be....  
 a)  $(a - x + 1)(a - x - 1)$                       b)  $(a + x - 1)(a - x + 1)$   
 c)  $(a + x + 1)(a - x - 1)$                       d) none of these

19. If  $2^x = 3^y = 6^{-z}$ , then  $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = \dots$   
 a)  $\frac{2}{x}$                       b)  $\frac{2}{y}$                       c)  $\frac{2}{z}$                        d) 0

20. The following question consist of two statements – Assertion (A) and Reason (R).  
 Answer these questions by selecting the appropriate option given below:  
 (i) Both A and R are true, and R is the correct explanation of A.  
 (ii) Both A and R are true, and R is not the correct explanation of A.  
 (iii) A is true but R is false.  
 (iv) A is false but R is true.

**Assertion:** If the radius of right circular cone is halved and height is doubled, the volume will be halved. (iii)  
**Reason:** In right circular cone, height, radius and slant height do not always be sides of a right triangle.

**SECTION - B**

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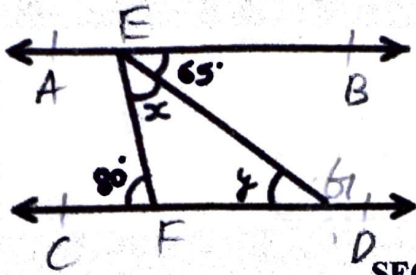
21. Find the cost of laying grass in a triangular field of sides 50m, 65m and 65m at the rate of Rs 7 per  $m^2$ .

22. Simplify:  $3\sqrt{3} + 2\sqrt{27} + \frac{7}{\sqrt{3}}$   
 OR  
 Simplify:  $\sqrt{2} \times \sqrt{2} \times \sqrt{32}$                       2

23. The total cost of making a solid spherical ball is Rs 67914 at the rate of Rs 14 per cubic meter. Find the radius of this ball. *10.5 m*

24. If  $x^2 + \frac{1}{x^2} = 14$ , find the value of  $x^3 + \frac{1}{x^3}$  *52*

25. If  $AB \parallel CD$  and  $\angle BEG = 65^\circ$  and  $\angle EFC = 80^\circ$ , find  $x$  and  $y$



SECTION - C

*27. Let  $\angle B = x$   
 $\angle A = x + 33$   
 $\angle C = x - 18$   
 $\angle A + \angle B + \angle C = 180$   
 $(x + 33) + x + (x - 18) = 180$   
 $3x + 15 = 180$   
 $3x = 165$   
 $x = 55$   
 $\angle A = 88^\circ, \angle B = 55^\circ, \angle C = 37^\circ$*

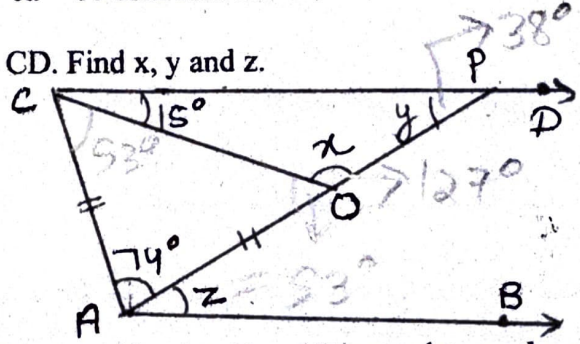
26. ABCD is a rhombus such that AC and BD intersect at origin. If AC = 3cm, BD = 4cm and A (0, 1.5), find the co-ordinates of B, C and D. *C(0, -1.5), B(-2, 0), D(2, 0)*

27. In triangle ABC,  $\angle A - \angle B = 33^\circ$  and  $\angle B - \angle C = 18^\circ$ . Find the angles of the triangles.

28. How many liters of milk can a hemispherical bowl of diameter 10.5cm hold?

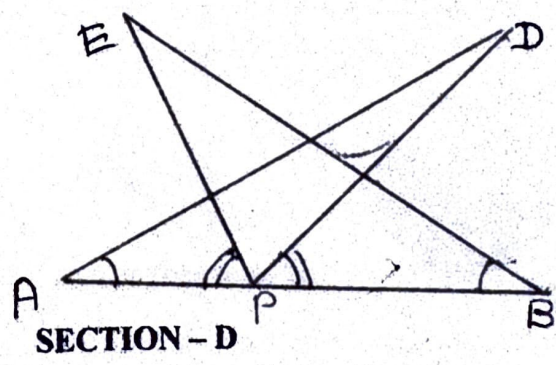
29. If  $a + b + c = 5$ ,  $ab + bc + ca = 10$  then find the value of  $a^3 + b^3 + c^3 - 3abc$

30. In the given figure,  $AB \parallel CD$ . Find  $x$ ,  $y$  and  $z$ .



31. AB is a line segment and P is its mid point. D and E are points on the same side of AB such that  $\angle BAD = \angle ABE$  and  $\angle EPA = \angle DPB$ . Show that

- I.  $\Delta DAP \cong \Delta EBP$
- II.  $AD = BE$



SECTION - D

32. Find the value of  $27x^3 + 8y^3$  if  $3x + 2y = 14$  and  $xy = 8$

If  $l + m + n = 0$ , then find the value of  $\frac{l^2}{mn} + \frac{m^2}{nl} + \frac{n^2}{lm} = 3$

33. A conical tent is 9m high and the radius of its base is 12m

- (i) What is the cost of the canvas required to make it, if a square meter canvas cost Rs 10.
- (ii) How many people can be accommodated in the tent, if each person requires  $2m^2$  space on the ground?

OR

The water for a factory is stored in a hemispherical tank whose internal diameter is 14m. The tank contains 50 kilolitres of water. Water is pumped into the tank to fill its capacity. Calculate the volume of water pumped into the tank.

34. (i) Determine the point of the linear equation  $2x + 5y = 9$  whose ordinate is  $1\frac{1}{2}$  times its abscissa.

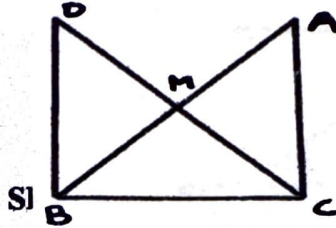
A number is 27 more than the number obtained by reversing its digits. If its unit and tens digit are  $x$  and  $y$  respectively, write the linear equation representing the above statement.

Express the linear equation in the form  $ax + by + c = 0$  and indicate the values of  $a$ ,  $b$  and  $c$ .

36. In a right triangle ABC, right angled at C, M is the mid-point of hypotenuse AB. C is joined to M and produced to D such that  $DM = CM$ . Point D is joined to B.

Show that:

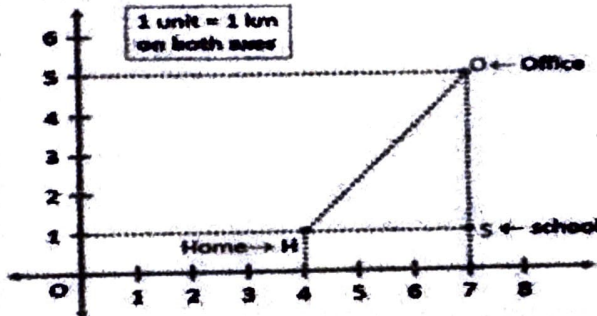
1.  $\triangle AMC \cong \triangle BMD$
2.  $\angle DBC$  is a right angle.
3.  $\triangle DBC \cong \triangle ACB$
4.  $CM = \frac{1}{2} AB$



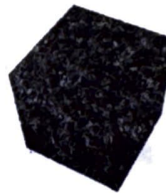
34. (ii)  $10y + x = 10x + y + 27$   
 $10y + x - 10x - y - 27 = 0$   
 $9y - 9x - 27 = 0$

36. Kavita has to reach her office every day at 10:00 am. On the way to her office, she drops her son at school. The location of Kavita's house, her son's school and her office are represented by the map below. Using the details given, answer the following questions.

- I. What are the coordinates of Kavita's home. (1)
- II. What are the coordinates of Kavita's office. (1)
- III. Find the distance in km between Kavita's home and her son's school. (1)
- IV. Find the distance in km between Kavita's office and her home. (1)



37. Amit along with his four friends visited the house of Rohit, who was a common friend. There they meet his father, who was having keen interest in Mathematics. Rohit's father wanted to test the practical knowledge of all his friends, so he showed some objects like a cuboid shaped geometry box, a rectangular photo frame, a circular cardboard, square shaped files and a cube. He started asking the following questions one by one.



On the basis of the above information, solve the following questions:  $x = 7y + 5$

- (i) If the area of circular cardboard is  $49\pi x^2 + 70\pi x + 25\pi$ , find the radius of this object. (2)
- (ii) The volume of the geometry box is  $x^3 - 2x^2 - x + 2$ , then find the possible dimensions of the geometry box.  $x - 2, x - 1, x + 1$  (1)
- (iii) If the volume of the cube is  $8a^3 - b^3 - 12a^2b + 6ab^2$ , find the side of the cube.  $2a - b$  (1)

38. Two classmates Ramesh and Anil simplified two different expressions during their revision hours.

Ramesh explains simplification of  $\frac{\sqrt{3}+1}{\sqrt{3}-1} + \frac{\sqrt{3}-1}{\sqrt{3}+1} = x + \sqrt{3}y$  by rationalizing the denominator while Anil explains the irrational numbers between two rational numbers.

- (i) What is the value of  $x$  and  $y$ ?  $x = 4, y = 0$  (2)
- (ii) What are the two irrational numbers between 0.21 and 0.22? *only one is correct* (1)
- (iii) Express  $4.\overline{15}$  in the form of  $p/q$  where  $q \neq 0$  (1)