AMRITA VIDYALAYAM

HALF YEARLY EXAMINATION 2017 - '18

Class : IX **Marks : 80**

Time : 3 hrs

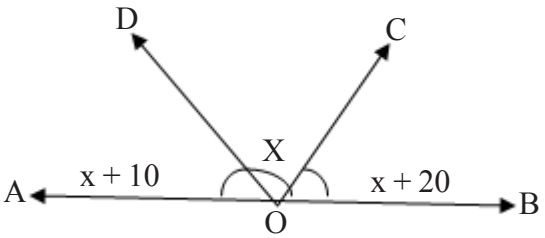
MATHEMATICS

General Instructions:

1. All questions are compulsory.
2. This question paper consists of 30 questions divided into four sections A, B, C and D. Section A comprises of 6 questions of 1 mark each, Section B comprises of 6 questions of 2 marks each, Section C comprises of 10 questions of 3 marks each and Section D comprises of 8 questions of 4 marks each.
3. There is no overall choice in the question paper.
4. Use of calculator is not permitted.

SECTION - A

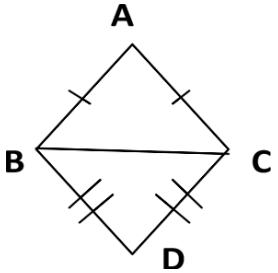
1. What type of numbers have their decimal expansions non-terminating and non repeating?
2. Find the value of k, if x - 2 is a factor of $2x^3 - 3x^2 + kx - 2$.
3. Write the co ordinates of a point which is at the same distance from the x - axis as the point (3, 2) but lies in 4^{th} quadrant.
4. An exterior angle of a triangle measures 140^0. If the interior opposite angles are in the ratio 3: 1 then find the angle of the triangle.
5. In the figure find x. Further find ∠BOC, ∠COD and ∠AOD.



6. If the perimeter of an equilateral triangle is 60 m then find its area.

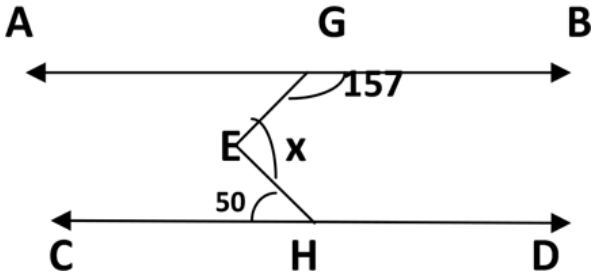
SECTION - B

7. Find the value of x, if $3^7 \times 3^5 = (3^3)^x$.
8. Evaluate using a suitable identity $(997)^3$.
9. Factorise $2x^2 + y^2 + 8z^2 - 2\sqrt{2}xy + 4\sqrt{2}yz - 8xz$.
10. Plot the following points on the graph paper.
    (1, -3), (2, 2.5), (-3.5, 1.5) and (0, 4)
11. The side of a rhombus is 10 cm and one diagonal is 16 cm, find the area of the rhombus.
12. In the figure, ΔABC and ΔDBC are two isosceles triangles on the same base BC. Prove that ∠ABD = ∠ACD.

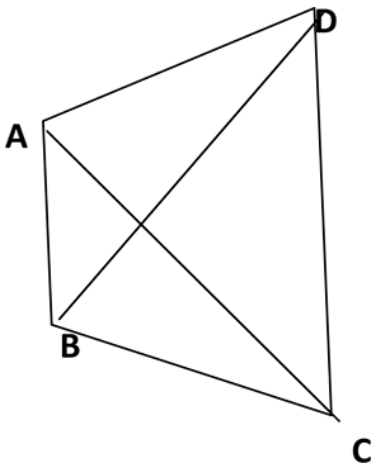


SECTION - C

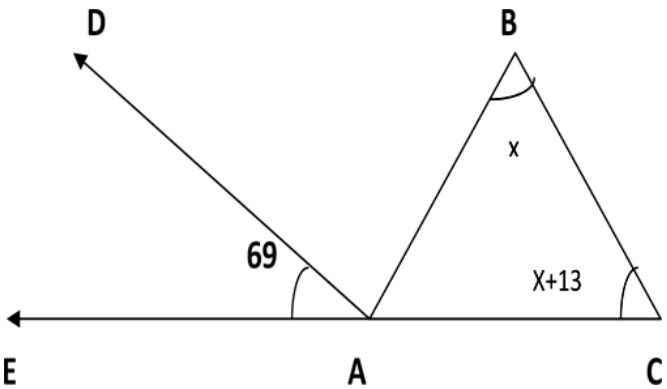
13. Visualise $4.\overline{26}$ on a numberline, upto 4 decimal places.
14. If $x + y + z = 10$ and $x^2 + y^2 + z^2 = 40$ then find $xy + yz + zx$.
15. Show that $x - 1$ is a factor of the polynomial $x^3 - 13x^2 + 32x - 20$. Hence factorise the polynomial.
16. Plot two points P (1, 3) and Q (2, 6) on the graph. Now, plot reflection of P and Q in X - axis and name them as S and R respectively. Identify the figure PQRS.
17. In the given figure AB || CD, find the value of x.



18. ABCD is a quadrilateral in which AD = BC and ∠DAB = ∠CBA. Prove that
    a) $\Delta ABD \cong \Delta BAC$ b) BD = AC c) ∠ABD = ∠BAC



19. An umbrella is made by stitching 10 triangular pieces of cloth, each measuring 60 cm, 60 cm and 20 cm. Find the area of the cloth required for the umbrella.
20. Express $18.\overline{48}$ in the form of p/q, where p and q are integers, $q \neq 0$.
21. Find the values of a and b if $\frac{3 + \sqrt{2}}{3 - \sqrt{2}} = a + b\sqrt{2}$.
22. In the given figure ∠CAB : ∠BAD = 1:2, find all the internal angles of ΔABC.



SECTION - D

23. Simplify.

$$\frac{6}{2\sqrt{3} - \sqrt{6}} + \frac{\sqrt{6}}{\sqrt{3} + \sqrt{2}} - \frac{4\sqrt{3}}{\sqrt{6} - \sqrt{2}}$$

24. Simplify.

$2\sqrt[4]{81} - 8\sqrt[3]{216} + 15\sqrt[5]{32} + \sqrt{225} - \sqrt[4]{16}$

25. If $2x + y = -5$, prove that $8x^3 + y^3 - 30xy + 125 = 0$.
26. The polynomial $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$ when divided by $x - 4$, leave the remainder p and q respectively. If $2p = q$, find the value of 'a'.
27. Without actually calculating the cubes, find the value of $(-¾)^3 + (-5/8)^3 + (11/8)^3$. Also write the identity used.
28. For spreading the message 'Save Girl Child, Save Future' a rally was organized by some students of a school. They were given a triangular cardboard piece PQR which they divided into two parts by drawing the angle bisectors QO and RO of base angles Q and R and wrote a slogan. Prove that $\angle QOR = 90 + ½ \angle P$. What is the benefit of these types of rallies?
29. Prove that angles opposite to equal sides of an isosceles triangle are equal.
30. Sides of a triangle are in the ratio 12:17:25 and its perimeter is 540 cm. Find its area.