AMRITA VIDYALAYAM

ANNUAL EXAMINATION 2018 - '19

Class : IX **Marks : 80**

Time : 3 hrs

MATHEMATICS

General Instructions:

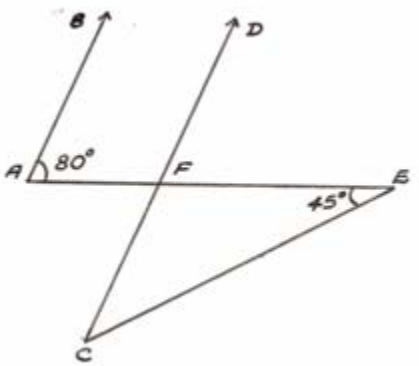
1. All questions are compulsory.
2. This question paper consists of 30 questions divided into four sections A, B, C and D. Section A comprises of 6 questions of 1 mark each, Section B comprises of 6 questions of 2 marks each, Section C comprises of 10 questions of 3 marks each and Section D comprises 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. If a and b are rational numbers, then $(\sqrt{a} + \sqrt{b})(\sqrt{a} - \sqrt{b})$ is rational. Is it true?
2. If x =2 is a root of the polynomial $f(x) = 2x^2 - 3x + 7a$, find the value of a.
3. The volume of a sphere is numerically equal to its surface area. Then find the radius of the sphere.
4. Find the length of each side of an equilateral triangle having an area of $9\sqrt{3}$ cm^2.
5. It is known that if x + y =10 then x + y + z = 10 + z . Name the Euclid´s axiom used.
6. If $x + \frac{1}{x} = 4$, then find the value of $x^2 + \frac{1}{x^2}$.

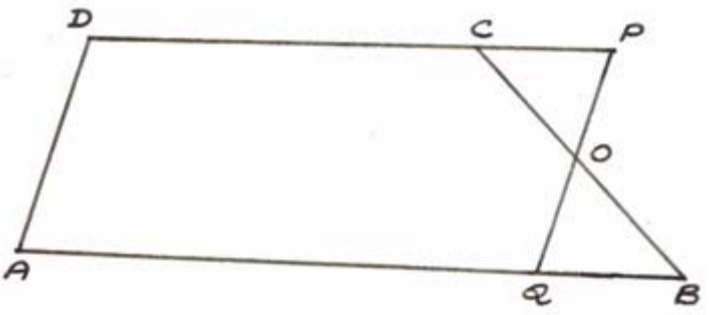
SECTION - B

7. Express $2.01\overline{5}$ in the form of $\frac{p}{q}$ where p and q are two integers and $q \neq 0$.
8. Without actually calculating the cubes find the value of $48^3 - 30^3 - 18^3$.
9. Find the remainder when $P(y) = y^3 + y^2 + 2y + 3$ is divided by y + 2 .
10. Represent $\sqrt{3}$ on the number line.
11. Find two different solutions of the equation 2x + 6y + 1 = 0 and check whether (- 3, 2) is solution of the given equation.
12. If AB parallel to CD, find the value of $\angle FCE$.



SECTION - C

13. In the adjoining figure, ABCD is a trapezium in which AB is parallel to DC. O is the midpoint of BC. Through the point O, a line QP parallel to AD has been drawn which intersects AB at Q and DC produced at P. Prove that ar (ABCD) = ar (AQPD).



14. Find the mean of the following data.

Marks	10	11	12	13	14	15
Number of students	6	3	4	5	7	5

15. A bag contains 7 blue, 8 red, 6 green and 5 yellow balls. A ball is drawn at random from the bag. Find the probability of getting
    a) a green ball. b) a yellow ball. c) a white ball.
16. Simplify.

$$\left(\frac{81}{16}\right)^{-3/4} \times \left[\left(\frac{25}{9}\right)^{-3/2} \div \left(\frac{5}{2}\right)^{-3}\right]$$

OR

Simplify.

$$\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}} + \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}$$

17. Find the value of polynomial $p(x) = 8x^3 - 6x^2 - 4x + 3$ when
    a) $x = \sqrt{2}$ b) $x = -½$.

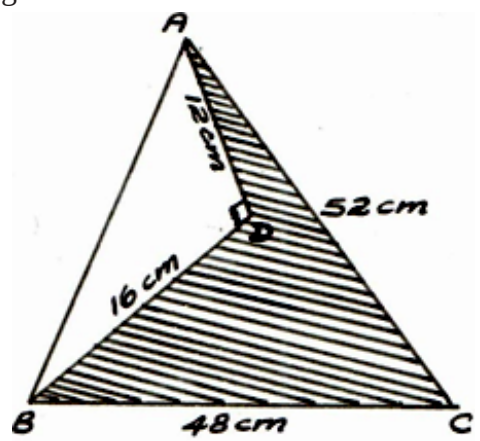
OR

Factorize. $4y^3 - 2y^2 - 4y + 2$

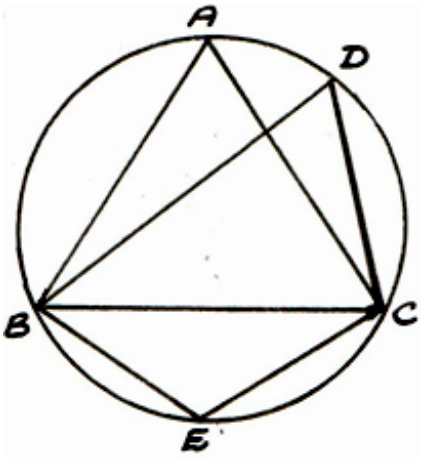
18. Expand the following using suitable identities.
    a) $27a^3 + 125b^3$ b) $\left(\frac{1}{3x} - \frac{2}{5y}\right)^3$
19. Solve the equation of $2x + 1 = x - 3$ and represent the solution
    a) on the number line. b) in the Cartesian plane.
20. Find the area of Rhombus whose perimeter is 80 m and one of whose diagonal is 24m.

OR

Find the area of the shaded region.



21. In figure ΔABC is an isosceles triangle with AB = AC and ∠ABC = 50^0. Find ∠BDC and ∠BEC.

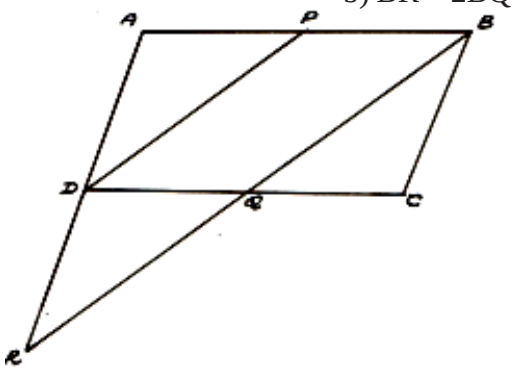


OR

Two circles of radius 5 cm and 3 cm intersect at two points and the distance between their centres is 4cm. Find the length of the common chord.

22. P is the midpoint of side AB of a parallelogram ABCD. A line through B parallel to PD meets DC at Q and AD produced at R. Prove that

a) AR = 2BC b) BR = 2BQ



SECTION - D

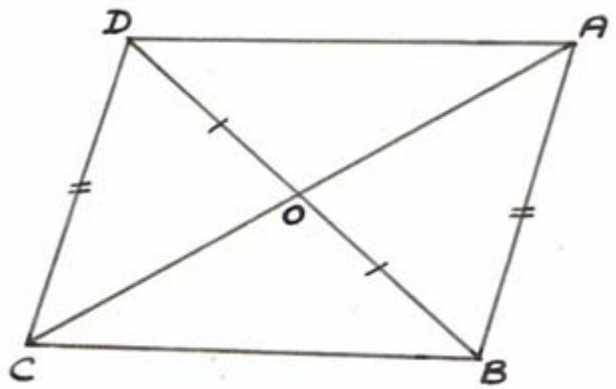
23. Plot the points P (3, 0), Q (7, 9), R (-6, 9) and S (-2, 0).

a) Name the figure PQRS. b) Find the area of PQRS.

24. In figure diagonals AC and BD of quadrilateral ABCD intersect at O such that OB = OD. If AB = CD, then show that

a) ar (ΔDOC) = ar (ΔAOB) b) ar (ΔDCB) = ar (ΔACB)

c) ABCD is a parallelogram.



25. A solid cylinder has a total surface area of 462 cm^2. Its curved surface area is one third of its total surface area. Find

    a) radius. b) height. c) volume.

    OR

    The diameter of a metallic ball is 4.2cm. What is the mass of the ball if the density of the metal is 8.9 gm /cm^3.

26. 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.

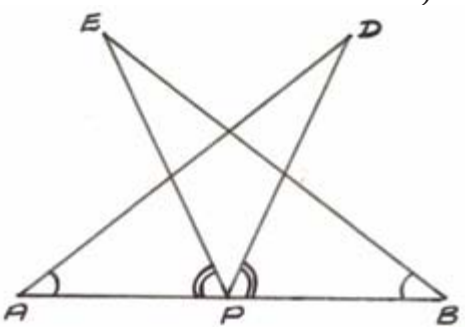
27. Construct a triangle ABC In which BC = 7.5 cm , $\angle B = 45^0$ and AB - AC = 2.5 cm.

    OR

    Construct a triangle PQR in which $\angle P = 45^0$, $\angle Q = 60^0$ and PQ + QR + RP = 11 cm.

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

    a) $\Delta DAP \cong \Delta EBP$ b) AD = BE



29. A conical heap is formed when a farmer pours food grains on a ground. The slant height of the heap is 25 m and the curved surface area is 550 m^2. The farmer donates one-fourth of the volume of food grains to a nearby orphanage. How much volume of food grains is donated and what value is shown by the farmer?

30. Draw a histogram for the marks of students given below.

Marks	0-10	10-30	30-45	45-50	50-60
Number of students	8	32	18	10	6

OR

Draw a frequency polygon for the following distribution.

Marks	0-10	10-20	20-30	30-40	40-50
Number of students	7	10	6	8	12