

FINAL EXAMINATION, 2017-18

MATHEMATICS

Time : 3 hrs.

Class : IX

M.M. : 80

Instructions :

- (i) All questions are compulsory.
- (ii) The question paper consists of 30 questions divided into four sections A, B, C and D.
- (iii) Section A contains 6 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 8 questions of 4 marks each.
- (iv) There is no overall choice. However, an internal choice has been provided in 4 questions of 3 marks each and 3 questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- (v) Use of calculators is not permitted.

SECTION—(A)

1. Write a rational number between $\sqrt{2}$ and $\sqrt{3}$.
2. What is the degree of the zero polynomial ?
3. What is the equation of the x axis ?
4. In which quadrant does the point (x, y) lie if $x < 0, y > 0$?

5. It is given that, $\triangle ABC$ and $\triangle FDE$ are congruent, $AB = 5$ cm, $\angle A = 80^\circ$ and $\angle B = 40^\circ$. What is the length of DF and also the measure of $\angle E$?

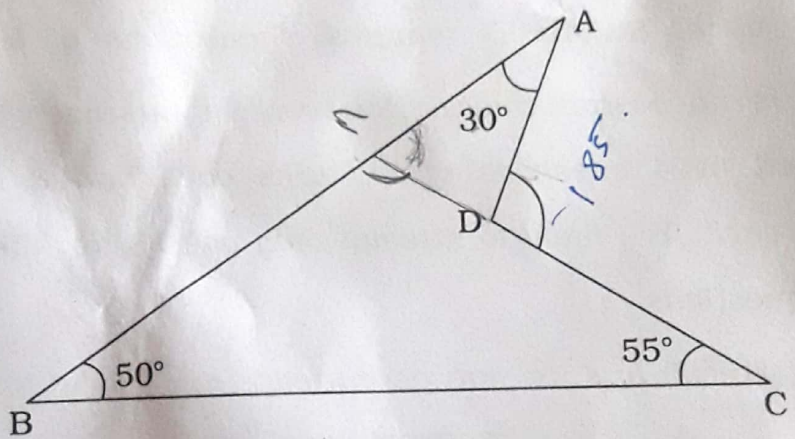
6. If the volume and surface area of a sphere is numerically equal, then find its radius. $\Rightarrow 3$

SECTION—(B)

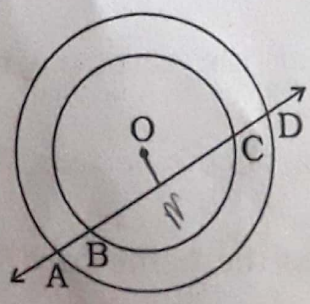
7. Find the value of k , for which the polynomial $x^3 - 3x^2 + 3x + k$, has 3 as its zero. $= -9$

8. Write any two of Euclid's Axioms.

9. Find $\angle ADC$ from the given fig.



10. In the given fig., prove that $AB = CD$



11. A right triangle ABC with sides 5 cm, 12 cm and 13 cm is revolved about the side 12 cm. Find the volume of the solid so obtained. - $39\pi \text{ cm}^3$

12. Find the median of the following data :
6, 9, 12, 15, 9, 8, 7, 8, 12, 8, 10, 8, 15, 6

SECTION-(C)

13. Express 0.235235235.... in p/q form.

OR

Locate $\sqrt{2}$ on the number line.

14. If the polynomials $(2x^3 + ax^2 + 3x - 5)$ and $(x^3 + x^2 - 2x + a)$ leave the same remainder when divided by $(x - 2)$, find the value of a .

15. Factorise :

$$2x^3 - 3x^2 - 17x + 30$$

16. Factorise :

$$2x^2 + y^2 + 8z^2 - 2\sqrt{2}xy + 4\sqrt{2}yz - 8xz$$

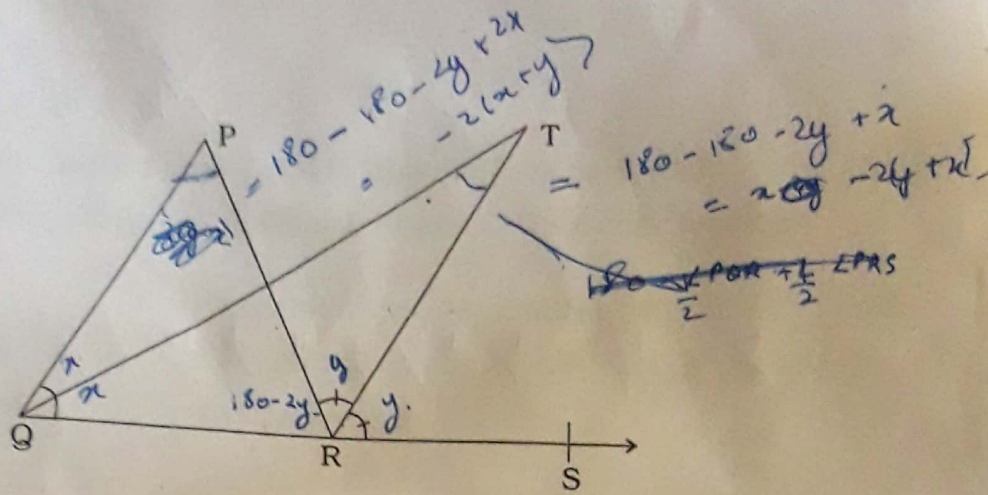
OR

Factorise :

$$27x^3 + y^3 + z^3 - 3xyz$$

17. Plot the points A (-5, 2), B (-4, -3), C (3, -2) and D (6, 0) on a graph paper and join them in order. Write the name of the figure formed.

18. In the given fig. (iii), the side QR of ΔPQR is produced to a point S. If the bisectors of $\angle PQR$ and $\angle PRS$ meet at a point T, then prove that :



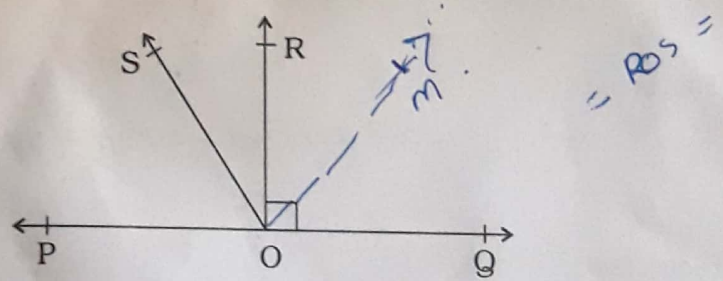
$\angle QPR = 2y - 2x$

$\angle QTR = \frac{1}{2} \angle QPR$

OR

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

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



19.

Diagonals AC and BD of a trapezium ABCD with $AB \parallel CD$ intersect each other at O. Prove that :

$\text{ar} (AOD) = \text{ar} (BOC)$

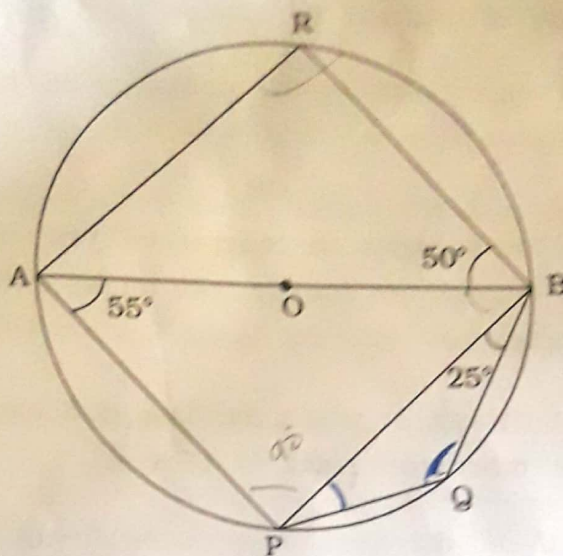
OR

In a triangle ABC, E is the midpoint of the median AD. Show that:

$\text{ar} (\Delta BED) = \frac{1}{4} \text{ar} (\Delta ABC)$

20.

In the given fig. AB is a diameter of a circle with centre O . If $\angle PAB = 55^\circ$, $\angle PBQ = 25^\circ$ and $\angle ABR = 50^\circ$, then find $\angle PBA$, $\angle BPQ$ and $\angle BQP$.



21.

Find the area of a triangle with sides 34 cm, 20 cm and 42 cm.

22.

Twenty seven solid iron spheres, each of radius 2 cm are melted to form a new solid sphere. What will be the surface area of the new sphere ?

$$452.16 \text{ cm}^2$$

SECTION—(D)

23.

Rationalise the denominator of $\frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$

24.

Sonika distributed chocolates on the occasion of Children's Day in a slum area. She gives 5 chocolates to each child and an additional 20 chocolates to the Adults. If the No. of a child is represented by x and the total No. of chocolates distributed as y ,

$$5x + 20 = y$$

(ii) Write the above statement in the form of a linear equation in two variables.

(iii) Draw the graph of the linear equation formed.

(iv) What value is depicted by Sonika ?

25. Prove that angles opposite to equal sides of an isosceles triangle are equal.

OR

Prove that Two triangles are congruent if two angles and the included side of one triangle are equal to two angles and the included side of other triangle.

26. Construct a triangle in which the base is 6 cm, $\angle B = 45^\circ$, and the sum of the other two sides is 11 cm.

27. Show that if the diagonals of a quadrilateral bisect each other at right angles then it's a rhombus.

OR

$ABCD$ is a rectangle and P, Q, R and S are the midpoints of AB, BC, CD and DA respectively. Show that the quadrilateral $PQRS$ is a rhombus.

28. A solid cube of side 12 cm is cut into eight cubes of equal volume. What will be the side of the new cube ? Also find the ratio between their surface areas. $(4:1)$ \therefore $24:1$

OR

A solid cylinder has total surface area of 462 sq cm. Its curved surface area is one-third of its total surface area. Find the volume of the cylinder. (Take $\pi = \frac{22}{7}$)

29. A study on cost of living index for a particular year in a city gave the following data :

Cost of living Index (Rs.)	140-150	150-160	160-170	170-180	180-190	190-200
No. of weeks	5	10	20	9	6	2

Draw a histogram and a frequency polygon of the above data on the same graph.

30. A die is thrown 250 times and the outcomes are noted as given below :

Outcome	1	2	3	4	5	6
Frequency	65	40	42	25	33	45

If a die is thrown at random then, find the probability of getting :

- (a) 1
- (b) a number equal to or less than 3
- (c) a prime number