

Name Arpit Kumar Class & Section 9-A Roll No. 9


FIRST TERM EXAMINATION—2017-18
CLASS-IX
SUBJECT-MATHEMATICS

Time : 3 Hours **M.M. : 80**

General Instructions :

1. All questions are compulsory.
2. The 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.

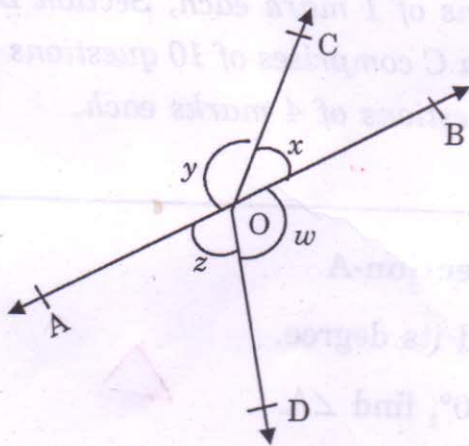
Section-A

1. Write a constant polynomial and its degree.
2. In $\triangle ABC$, $AB = AC$ and $\angle B = 50^\circ$, find $\angle A$. 
3. ACB is a line and a ray CD stands on it such that $\angle DCA = 5x$, $\angle DCB = 4x$. Find x .
4. Without plotting the points indicate the quadrant in which they will lie if :
 (i) ordinate is (-3) and abscissa is (-2)
 (ii) Abscissa is 5 and ordinate is (-6)
5. Simplify : $(\sqrt[3]{x^2})^{\frac{3}{4}}$ $= (x^2)^{\frac{1}{4} \times \frac{3}{4}} = (x^2)^{\frac{3}{16}}$ $\sqrt[3]{8} = (8)^{\frac{1}{3}}$
6. If the radius of a sphere is $2r$, then find its volume.

Section-B

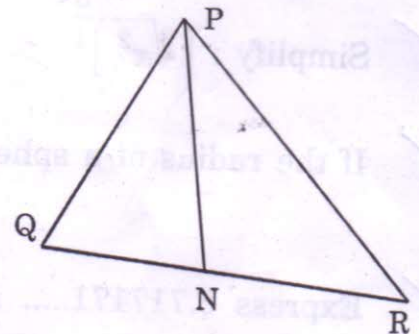
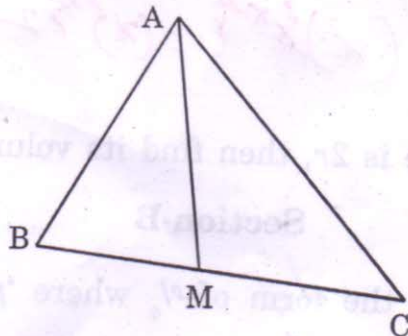
7. Express $6.717171.....$ in the form of $\frac{p}{q}$ where 'p' and 'q' are integers and $q \neq 0$.

8. Using factor theorem, determine whether $g(x) = 3x - 2$ is a factor of $p(x) = 2x^3 + x^2 - 2x - 1$
9. If a point C lies between two points A and B such that $AC = BC$, then prove that $AC = \frac{1}{2}AB$. State the Euclid's axiom used.
10. A hemispherical bowl is made of steel 0.25 cm thick. The inner radius of the bowl is 6 cm. Find the outer curved surface area of the bowl.
11. Prove that angles opposite to equal sides of a triangle are equal.
12. If $x + y = w + z$, then prove that AOB is a line.



Section-C

13. Represent $\sqrt{7.6}$ on the number line.
14. Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of ΔPQR . Show that—
- (i) $\Delta ABM \cong \Delta PQN$
- (ii) $\Delta ABC \cong \Delta PQR$



15. A sphere and a right circular cylinder of the same radius have equal volumes. By what percentage does the diameter of the cylinder exceeds its height?

$$4r = 3h$$

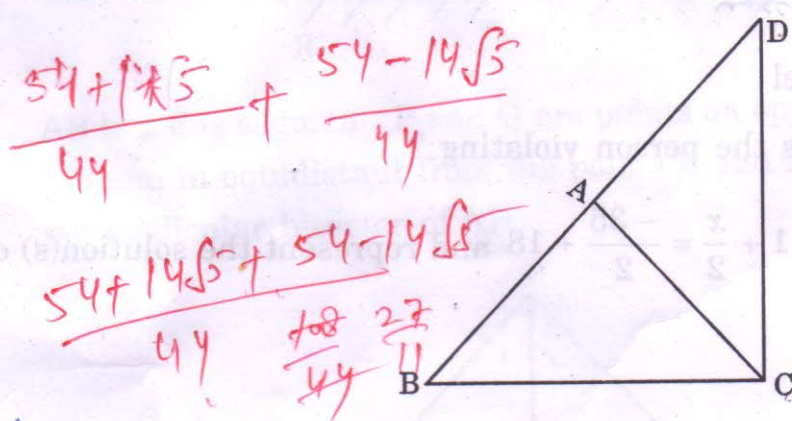
16. Find the values of 'a' and 'b' :

$$\frac{7 + \sqrt{5}}{7 - \sqrt{5}} + \frac{7 - \sqrt{5}}{7 + \sqrt{5}} = a + \frac{7}{11}\sqrt{5}b$$

$$a = \frac{20}{11} \quad b = 0$$

17. Verify $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$ and hence factorise $64m^3 - 343n^3$

18. $\triangle ABC$ is an isosceles triangle in which $AB = AC$ side BA is produced to D such that $AD = AB$. Show that $\angle BCD$ is a right angle.



$$\frac{54 + 14\sqrt{5}}{44} + \frac{54 - 14\sqrt{5}}{44} = \frac{108}{44} = \frac{27}{11}$$

$$\frac{54 + 14\sqrt{5} + 54 - 14\sqrt{5}}{44} = \frac{108}{44} = \frac{27}{11}$$

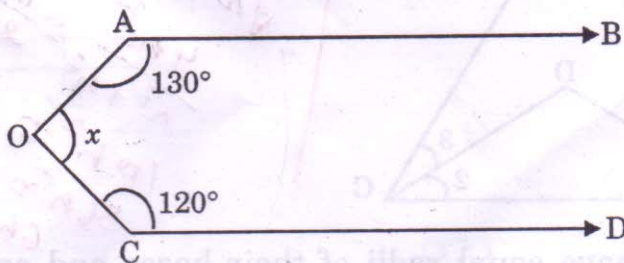
$$\frac{7 + \sqrt{5}}{7 - \sqrt{5}} \times \frac{7 + \sqrt{5}}{7 + \sqrt{5}} = \frac{49 + 7\sqrt{5} + 7\sqrt{5} + 5}{44} = \frac{54 + 14\sqrt{5}}{44}$$

$$\frac{7 - \sqrt{5}}{7 + \sqrt{5}} \times \frac{7 + \sqrt{5}}{7 + \sqrt{5}} = \frac{49 - 7\sqrt{5} - 7\sqrt{5} + 5}{44} = \frac{54 - 14\sqrt{5}}{44}$$

19. Plot the points (x, y) given by the following table on the Cartesian plane :

x	-1	2	5	6	-3	-5
y	3	4	3	-2	-1	-2

20. In the given figure $AB \parallel CD$. Find the value of x .



21. Let cost of a pen and a pencil be 'x' and 'y' respectively. A girl pays ₹ 16 for 2 pens and 3 pencils. Write the given data in the form of a linear equation in two variable. Also represent it graphically.

22. 30 circular plates, each of radius 14 cm and thickness 3 cm are placed one above the another to form a cylindrical solid. Find :

- (i) the total surface area
- (ii) volume of the cylinder so formed.

Section-D

23. A person pays ₹ 2200 to children to paint the inner curved surface of a cylindrical vessel 10 m deep. If the cost of painting is at the rate of ₹ 20 per m^2 , find :

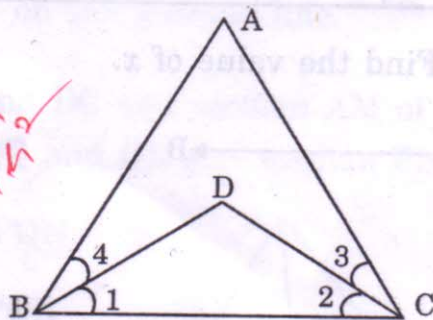
- (i) inner curved surface area of the vessel
- (ii) radius of the base
- (iii) capacity of the vessel
- (iv) which social value is the person violating ?

24. Solve the equation $3x + 11 + \frac{x}{2} = \frac{-35}{2} + 18$ and represent the solution(s) on :

- (i) the number line
- (ii) the cartesian plane.

25. Factorise : $2x^3 - 3x^2 - 17x + 30$

26. If $\angle ABC = \angle ACB$, $\angle 3 = \angle 4$, show that $\angle 1 = \angle 2$. State the Euclid's axiom used. Also state Euclid's fifth postulate.



Handwritten notes for Q26:

$$r = \sqrt{2 \times h^2}$$

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Handwritten notes for Q26:

$$\frac{2h}{\sqrt{2 \times h^2}} = \frac{8}{5}$$

$$\frac{4h^2}{2 \times h^2} = \frac{64}{25}$$

$$10h^2 = 64h^2 + 64h^2$$

$$86h^2 = 64h^2$$

$$6h = 8h$$

27. A cylinder and a cone have equal radii of their bases and equal heights. If their curved surface areas are in the ratio 8 : 5, then show that the radius and the height of each solid has the ratio 3 : 4.

Handwritten notes for Q27:

$$\frac{2\pi r h}{\pi r l} = \frac{8}{5}$$

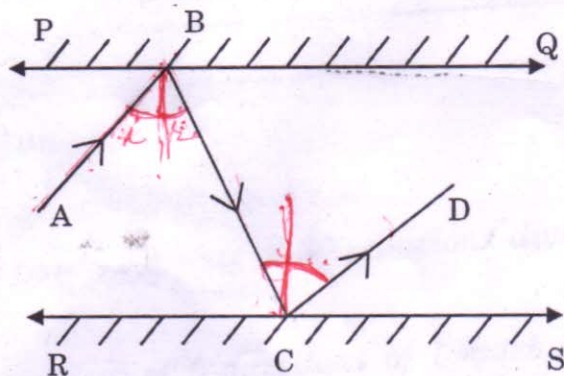
$$\frac{2h}{l} = \frac{8}{5}$$

Handwritten notes for Q27:

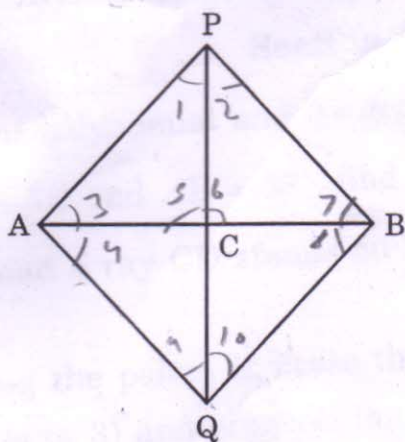
$$3h = 4h$$

$$h = \frac{4}{3}$$

28. PQ and RS are two mirrors placed parallel to each other. An incident ray AB strikes the mirror PQ at B, the reflected ray moves along the path BC and strikes the mirror RS at C and again reflects back along CD. Prove that $AB \parallel CD$.



29. AB is a line segment. P and Q are points on opposite side of AB such that each of them is equidistant from the points A and B. Show that the line PQ is the perpendicular bisector of AB.



30. Rationalise :

$$\frac{1}{\sqrt{3} + \sqrt{2} - \sqrt{5}}$$

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