CBSE Class 9 Maths

SAMPLE QUESTION PAPER - 5

Solved

Time : 3 Hours **Maximum Marks : 90**

SECTION 'A'

Question numbers 1 to 4 carry one mark each. For each question four alternative choices have been provided of which only one is correct. You have to select the correct choice.

1. **The simplified value of $(81)^{-1/4} \times \sqrt[4]{81}$ is :**

   (A) 9 (B) 3 (C) 1 (D) 0

2. **If $\frac{x}{y} + \frac{y}{x} = -1$, $(x \neq y, y \neq 0)$, then the value of $x^3 - y^3$ is :**

   (A) -1 (B) 1 (C) 0 (D) $\frac{1}{2}$

3. **If $p(x) = 3x^3 - 2x^2 - x + 4$, then $p(-1)$ is equal to :**

   (A) -2 (B) 4 (C) 0 (D) 6

4. **A policeman and a thief equidistant from the jewel box. Upon considering jewel box as origin, the position of policeman is (0, 5). If the ordinate of the position of thief is zero, then write the coordinates of the position of thief.**

   (A) $(y, 0)$ (B) $(5, 0)$ (C) $(0, x)$ (D) $(0, y)$

SECTION 'B'

Question numbers 5 to 10 carry two marks each.

5. Simplify : $\sqrt{50} - \sqrt{98} + \sqrt{162}$.

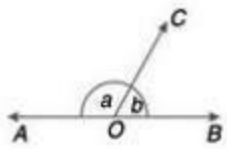
6. Simplify : $\left(x+\frac{1}{x}\right)\left(x-\frac{1}{x}\right)\left(x^2+\frac{1}{x^2}\right)\left(x^4+\frac{1}{x^4}\right)$.

7. Factorise : $m(m-1) - n(n-1)$

8. In the given figure, if $AB = CD$, then prove that $AC = BD$. Also write the Euclid's axiom used for proving it.

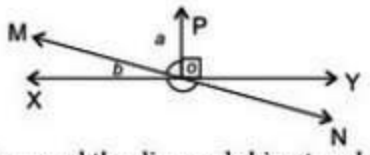
9. In the given figure, $\angle AOC$ and $\angle BOC$ form a line AB.

   If $a - b = 80°$, find the values of a and b.

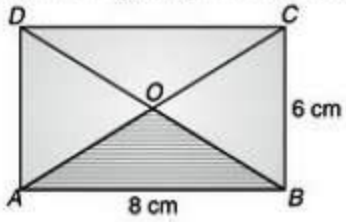


OR

In the figure, lines XY and MN intersect at O. If $\angle POY = 90°$ and $a : b = 2 : 3$, find the value of c.



10. In the given figure, $ABCD$ is a rectangle, where $AB = 8$ cm, $BC = 6$ cm and the diagonals bisect each other at O. Find the area of the shaded region by Heron's formula.



SECTION 'C'

Question numbers 11 to 20 carry three marks each.

11. Simplify : $\left[5^2\left(8^{1/3}+27^{1/3}\right)^3\right]^{1/5}$

OR

Show that $\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2} = 5$

12. Find the value of : $x^3 + y^3 + 15xy - 125$, when $x + y = 5$

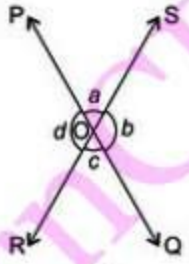
13. Factorise : $125x^3 - 27y^3 + z^3 + 45xyz$.

OR

Find the value of a for which $(x - a)$ is a factor of the polynomial $x^6 - ax^5 + x^4 - ax^3 + 3x - a + 2$.

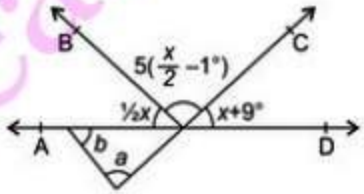
14. If $\frac{3}{4\sqrt{5}-\sqrt{3}} + \frac{2}{4\sqrt{5}+\sqrt{3}} = a\sqrt{5} + b\sqrt{3}$, find the values of a and b.

15. Lines PQ and RS intersect each other at O (see figure). If $\angle POR : \angle ROQ = 5 : 7$, find all the angles a, b, c and d.



OR

In the given figure, find $a + b$.

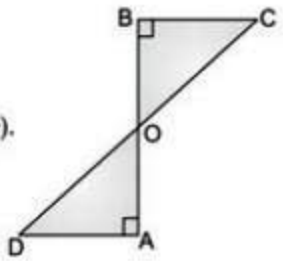


16. AD and BC are equal perpendiculars to a line segment AB (See figure).

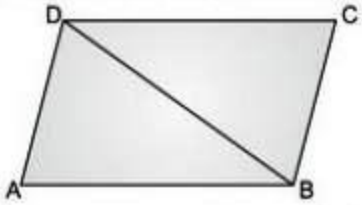
(i) Show that CD bisects AB.

(ii) Which mathematical concept is used in this problem ?

(iii) What is its value ?

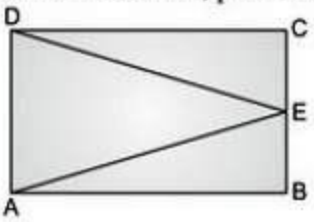


17. In the given figure, $AB = CD$, $\angle ABD = \angle CDB$. Prove that $AD = CB$.



18. The adjacent sides of a parallelogram are 34 cm, 20 cm and a diagonal is 42 cm. Find the area of the parallelogram.

19. In a rectangle $ABCD$, E is a point which bisects BC, prove that $AE = DE$.



20. "If a side of a triangle is produced then the exterior angle so formed is equal to the sum of interior opposite angles". Prove it.

SECTION 'D'

Question numbers 21 to 31 carry four marks each.

21. Find the values of a and b in $\frac{3-\sqrt{5}}{3+2\sqrt{5}} = a\sqrt{5} - \frac{b}{11}$.

OR

(i) Find six rational numbers between 3 and 4.

(ii) Which mathematical concept is used in this problem ?

(iii) Which value is depicted in this question ?

22. Prove that : $\left(\frac{x^a}{x^b}\right)^{\frac{1}{ab}} \times \left(\frac{x^b}{x^c}\right)^{\frac{1}{bc}} \times \left(\frac{x^c}{x^a}\right)^{\frac{1}{ca}} = 1$

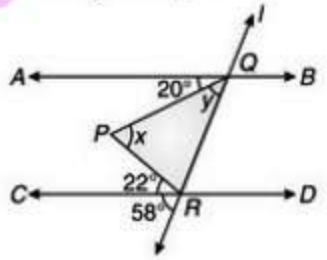
23. Factorise : $(a^2 - 2a)^2 - 23(a^2 - 2a) + 120$.

24. If the polynomials $f(x) = x^4 - 2x^3 + 3x^2 - 9x + 3a - 7$, when divided by $x + 1$ leaves the remainder 20, then find the value of a. Also find the remainder, when $f(x)$ is divided by $x + 2$.

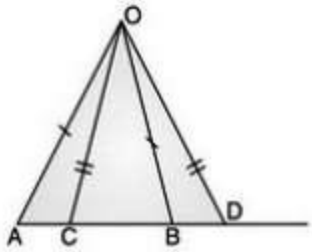
25. Verify $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$. Hence factorise $216x^3 - 125y^3$.

26. If $x + a$ is a factor of the polynomial $x^2 + px + q$ and $x^2 + mx + n$, prove that $a = \frac{n-q}{m-p}$.

27. In the given figure, find the value of x and y if $AB \parallel CD$.

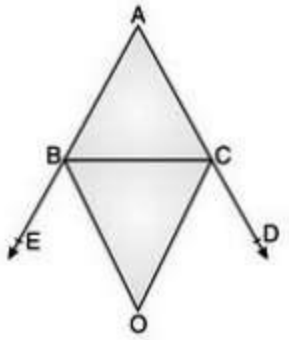


28. In figure $OA = OB$, $OC = OD$ and $\angle AOB = \angle COD$. Prove that $AC = BD$.

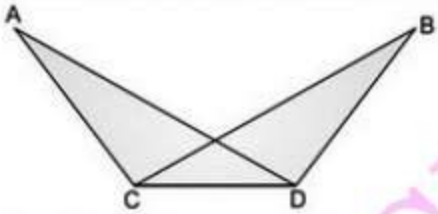


OR

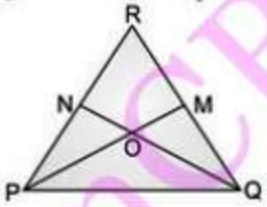
In figure, the sides AB and AC of ΔABC are produced to points E and D respectively. If bisectors BO and CO of $\angle CBE$ and $\angle BCD$ respectively meet at a point O, then prove that $\angle BOC = 90° - \frac{1}{2}\angle BAC$.



29. In the given figure, $\angle BCD = \angle ADC$ and $\angle ACB = \angle BDA$. Prove that (i) $AD = BC$, (ii) $\angle A = \angle B$.



30. In the given figure, $RP = RQ$ and M and N are respectively points on sides QR and PR of ΔPQR, such that $QM = PN$. Prove that $OP = OQ$, where O is the point of intersection of PM and QN.



31. Kamla has a triangular field with sides 240 m, 200 m, 360 m, where she grew wheat. In another triangular field with sides 240 m, 320 m, 400 m adjacent to previous field, she wanted to grow potatoes and onions (see figure). She divided the field in two parts by joining the midpoints of the longest side to the opposite vertex and grew potatoes in one part and onions on the other part. How much area (in hectares) has been used for wheat, potatoes and onions ? (1 hectare = 10,000 m^2)