Maths Halidays H·w

Class- IX

NUMBER SYSTEM

Multiple Choice Questions

1. The product of any two irrational numbers is:
   (A) always an irrational number
   (B) always a rational number
   (C) always an integer
   (D) sometimes rational, sometimes irrational

2. The value of $1.999\ldots$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$, is:
   (A) $\frac{19}{10}$ (B) $\frac{1999}{1000}$ (C) 2   (D) $\frac{1}{9}$

3. $2\sqrt{3} \times \sqrt{3} + 1$ is equal to :

   (A) $2\sqrt{9}$ (B) 6   (C) 7   (D) $4\sqrt{6}$

4. Between two rational numbers:
   (A) there is no rational number
   (B) there is exactly one rational number
   (C) there are infinitely many rational numbers
   (D) there are only rational numbers and no irrational numbers

5. which of the following is equal to x?

   (A) $x^{\frac{12}{7}} - x^{\frac{5}{7}}$ (B) $\sqrt[12]{(x^4)^{\frac{1}{3}}}$ (C) $(\sqrt{x^3})^{\frac{2}{3}}$ (D) $x^{\frac{12}{7}} \times x^{\frac{7}{12}}$

Short Answer Type Questions

6. Find the three rational numbers between:
   (i) -1 and -2   (ii) 0.1 and 0.11   (iii) $\frac{5}{7}$ and $\frac{6}{7}$ (iv) $\frac{1}{4}$ and $\frac{1}{5}$

7. Represent geometrically the following numbers on the number line:
   (i) $\sqrt{4.5}$ (ii) $\sqrt{5.6}$ (iii) $\sqrt{8.1}$ (iv) $\sqrt{2.3}$

8. Simplify $16^{\frac{-1}{4}} \times \sqrt[4]{16}$

9. Find the value of x in $3 + 2^x = (64)^{\frac{1}{2}} + (27)^{\frac{1}{3}}$.

10. If a = -2 , b = -1, then find $a^{-b} - b^a$.

Long Answer Type Questions

11. If $x = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ and $y = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$, find the value of $x^2 + y^2 + xy$.

12. If $x = \dfrac{2-\sqrt{5}}{2+\sqrt{5}}$ and $y = \dfrac{2+\sqrt{5}}{2-\sqrt{5}}$, find the value of $x^2 - y^2$.

13. Determine rational numbers p and q if
$$\dfrac{7+\sqrt{5}}{7-\sqrt{5}} - \dfrac{7-\sqrt{5}}{7+\sqrt{5}} = p - 7\sqrt{5}\,q.$$

14. Simplify: $\dfrac{6}{2\sqrt{3}-\sqrt{6}} + \dfrac{\sqrt{6}}{\sqrt{3}+\sqrt{2}} - \dfrac{4\sqrt{3}}{\sqrt{6}-\sqrt{2}}.$

15. Simplify: $\dfrac{3\sqrt{2}}{\sqrt{6}-\sqrt{3}} + \dfrac{2\sqrt{3}}{\sqrt{6}+2} - \dfrac{4\sqrt{3}}{\sqrt{6}-\sqrt{2}}.$

16. Show that: $\dfrac{1}{3-\sqrt{8}} - \dfrac{1}{\sqrt{8}-\sqrt{7}} + \dfrac{1}{\sqrt{7}-\sqrt{6}} - \dfrac{1}{\sqrt{6}-\sqrt{5}} + \dfrac{1}{\sqrt{5}-2} = 5$

17. If: $x = \dfrac{\sqrt{p+q}+\sqrt{p-q}}{\sqrt{p+q}-\sqrt{p-q}}$, then find the value of $qx^2 - 2px + q$.

18. Show that: $\dfrac{x^{-1}+y^{-1}}{x^{-1}} + \dfrac{x^{-1}-y^{-1}}{x^{-1}} = \dfrac{x^2+y^2}{xy}$

19. If $x = 2 + 3\sqrt{2}$, then find the value of $\left(x + \dfrac{14}{x}\right)$.

20. Find the value of a and b in the following:

   (i) $\dfrac{5+2\sqrt{3}}{7+4\sqrt{3}} = a - b\sqrt{3}$

   (ii) $\dfrac{\sqrt{2}+\sqrt{3}}{3\sqrt{2}-2\sqrt{3}} = a + b\sqrt{6}$

21. To judge the preparation of student's class IX on topic " Number System" Mathematics teachers write two numbers on black board (as shown in figure), and asks some questions about the members, which are following, then answer the question:
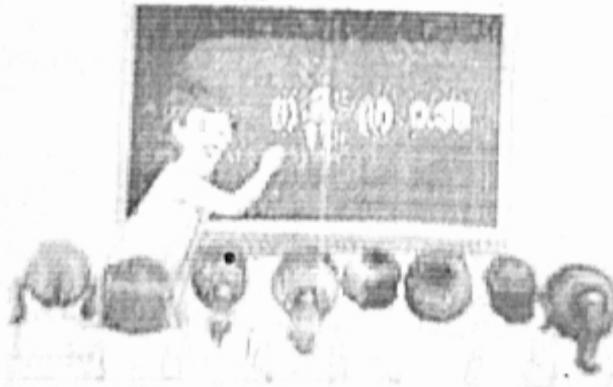
   (i)   Write the decimal form of 2/11
   (ii)   Write the p/q form of 0.38.
          Write the decimal expansion of 2/11.
   (iii) If p/q form of 0.38 is m/n, then find the value of (m + n)

POLYNOMIALS

Multiple Choice Questions

1. The degree of the polynomial $3x^3 - x^4 + 5x + 3$ is:?
   (A) 3   (B) – 4   (C) 4   (D) 1

2. If $p(x) = 5x^2 - 3x + 7$, then $p(1)$ equals to
   (A) – 10   (B) 9   (C) – 9   (D) 10

3. If $\frac{x}{y} + \frac{y}{x} = -1, (x, y \neq 0)$, then the value of $x^3 - y^3$ is
   (A) 1   (B) – 1   (C) 0   (D) ½

4. The remainder when $f(x) = x^3 - 2x^2 + 6x - 2$ is divided by $(x - 2)$, is
   (A) 5   (B) 8   (C) – 10   (D) 10

5. If $(x + 1)$ and $(x - 1)$ are the factors of $f(x) = ax^3 + bx^2 + cx + d$, then
   (A) a + b = 0   (B) b + c = 0   (C) b + d = 0   (D) a + d = 0

Short Answer Type Questions

6. If $f(x) = 2x^3 - 15x^2 + 15x + 2$, find $f(2)$ and $f(-3)$.

7. If $x = 2$ is a root of the polynomial $f(x) = 2x^2 - 3x + 7a$, find the value of a.

8. Check whether the polynomial $f(x) = 4x^3 + 4x^2 - x - 1$ is a multiple of $2x + 1$.

9. If $x + 1$ is a factor of the polynomial $2x^2 - kx$, then find the value of k.

10. Find the coefficient of x^2 in $(x^2 - 2)^3$.

11. Find the value of (using identity only) i) $249^2 - 248^2$ ii) 95×96.

Long Answer Type Questions

12. Expand :   i) $\left(\frac{1}{x} + \frac{y}{3}\right)^3$

    ii) $\left(4 - \frac{1}{3x}\right)^3$

13. $x + \frac{1}{x} = 3$, find the value of $x^2 + \frac{1}{x^2}$ and $x^3 + \frac{1}{x^3}$.

14. If $x - 2y = 11$ and $xy = 8$, find the value of $x^3 + 8y^3$.

5. If $p(x) = x^3 + 3x^2 - 2x + 4$, find the value of $p(-2) + p(1) + p(0)$.

16. If $a + b + c = 6$ and $ab + bc + ca = 11$, find the value of $a^3 + b^3 + c^3 - 3abc$.

17. Using identities, find the product of

i) $(x + 1)(x - 1)(x^2 + 1)(x^4 + 1)$.

ii) $\left(x - \frac{y}{5} - 1\right)\left(x + \frac{y}{5} - 1\right)$.

18. Rationalise the denominator and simplify:

$$\frac{2\sqrt{6} - \sqrt{5}}{3\sqrt{5} - 2\sqrt{6}}$$

19. Simplify

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

20. Find the value of $\frac{6}{\sqrt{5} - \sqrt{3}}$, it being given that $\sqrt{3} = 1.732$ and $\sqrt{5} = 2.236$.

21. On one day, principal of a particular school visited the classroom. Class teacher was teaching the concept of polynomial to students. He was very much impressed by her way of teaching. To check, whether the students also understand the concept taught by her or not, he asked various questions to students. Some of them are given below. Answer them.

i) Find the value of a, when x +1 is a factor of $x^3 - 2ax^2 + 16$.
ii) Find the value of k, when x – 1 is a factor of $4x^3 - 3x^2 - 4x + k$.
iii) How many zeroes are there in the polynomial $x^2 + 4x + 2$.

Holiday homework

Class 9th (MATHS)

HERON'S FORMULA

1. Plot the points P(0,-4) and Q(0,4) on the graph paper. Now ,plot the points R and S such that $\triangle$PQR and $\triangle$PQS are isosceles triangles.

2. Draw an equilateral triangle ABC in which the co-ordinates of the vertices B and C are (3,0) and (-3,0) respectively. Find the co-ordinates of the vertex A.

3. Plot the points P(-1,0) ,Q(0,1) and R(2,3) on the graph paper and check whether they are collinear or not.

4. Plot the points A(4,4), B(-4,4) , O(0,0). Write the name of the type of triangle obtained by joining these points and find its area.

5. Write the coordinates of the vertices of a rectangle whose length and breadth are 5 and 3 units respectively. One vertex at the origin , the longer side lies on the X-axis and one of the vertices lies in the third quadrant.

6. Plot the point P(-6,2) and from it draw PM and PN as perpendicular to x-axis and y-axis. Write the co-ordinate of M &N.

7. In rectangle OABC, point O is the origin OA=10 units along x-axis, AB=8 units. Find the co-ordinates of vertices A,B and C

8. Find the area of an equilateral triangle with side 10 cm.

9. If the angles of a triangle are in the ratio 2:3:4 find the angles of the triangle.

10. The area of a triangle is 48 cm². If its base is 12 cm, find its altitude.

11. The hypotenuse of an isosceles right triangle is 10 cm. Find its area.

12. A rhombus has perimeter 120 m and one of its diagonal is 50m. Find the area of the rhombus.

CASE STUDY BASED QUESTIONS

13. Mayank bought a triangle shape field and wants to grow potato and wheat on his field. He divided his field by joining opposite sides. On the largest park he grew wheat and on the rest part he grew potato. The dimensions of a park are shown in the park.
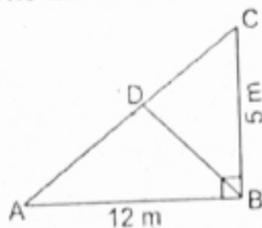
On the basis of the above information, solve the following questions

Q 1. Find the length of AC in $\triangle$ABC.

Q 2. Find the area of $\triangle$ABC.

Q 3. If the cost of ploughing park is ₹5 per cm², then find the total cost of ploughing the park.

14. Four friends Aakansha, Prabhat, Puneet and Lalit are sitting in a park at points A, B, C and D respectively. This park has been divided into small squares by drawing equally distanced horizontal and vertical lines. Consider XOX' and YOY' as coordinate axes.
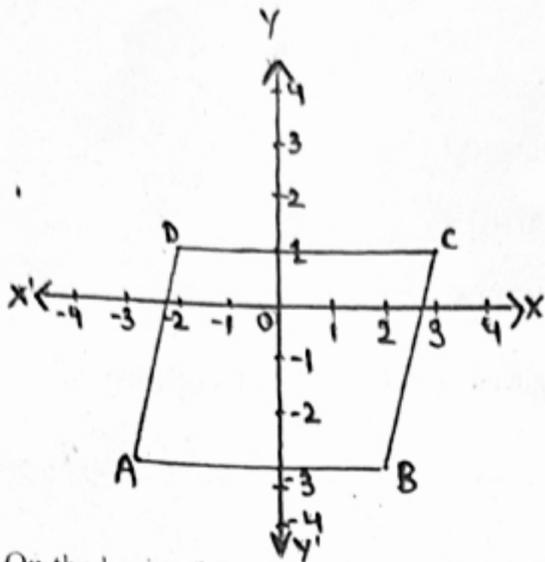
On the basis of the above information, solve the following questions:

Q. 1. Find the coordinates of B.

Q. 2. In which quadrant, point A is located?

Q. 3. Find the image of a point A with respect to Y-axis.

Q 4. Find the area of figure.

15. In the current scenario, people use such door whose top half part is made of glass and bottom half part is wooden.
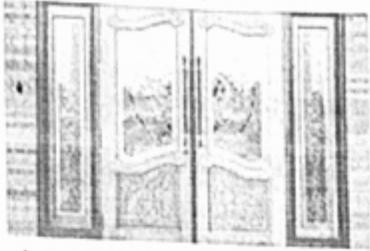
The glass portion of the door is having length and width in the ratio of 5 : 3. The wooden frame around the glass portion adds 11 inches to the total width and 14 inches to the total length. Consider the length of the glass portion as $5x$ inches:

On the basis of the above information, solve the following questions:

Q. 1. Find the total length of the glass portion of the door (in inches) is represented in terms of x.

Q. 2. Find the total width of the glass portion of the door (in inches).

Q. 3. Write the polynomial representation of the area top half part of the door.

Q. 4. Find the zeroes of the polynomial representing the area.

16. Mrs. Rakhi lives in an undeveloped area where there is no facility of proper education. But one thing is available in that area i.e., network. Since she was very keen to take education, so she decided to complete her education through e-learning. One day she was studying number system, where she learnt about rational numbers, irrational numbers and decimal numbers, etc.

On the basis of the above information, solve the following questions:

Q 1. Convert the rational number $\frac{2}{15}$ into decimal number.

Q 2. Write one irrational number between 2.365 and 3.125 .

Q 3. If $x+\sqrt{2}=3$, then find the value of $\frac{1}{x}$.

Q4. Find the product of two irrational numbers $(7+3\sqrt{2})$ and $(7-3\sqrt{2})$.

17. **Prepare a project on the undiscovered monuments of Haryana. (Any one)**

18. **Do the following activities in your practical file**

- Quadrants and coordinates
- Construction of a square root spiral
- Verify $a^3-b^3 = (a-b)(a^2+ab+b^2)$ using unit cubes.
- Verify $a^3+b^3 = (a+b)(a^2-ab+b^2)$ using unit cubes.