

D.A.V. PUBLIC SCHOOL, AIROLI
WORKSHEET: MATHEMATICS
CLASS: IX (2024-25)
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 $1.999\dots$ 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 $x = \frac{2-\sqrt{5}}{2+\sqrt{5}}$ and $y = \frac{2+\sqrt{5}}{2-\sqrt{5}}$, find the value of $x^2 - y^2$.

13. Determine rational numbers p and q if

$$\frac{7+\sqrt{5}}{7-\sqrt{5}} - \frac{7-\sqrt{5}}{7+\sqrt{5}} = p - 7\sqrt{5}q.$$

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

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

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

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

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

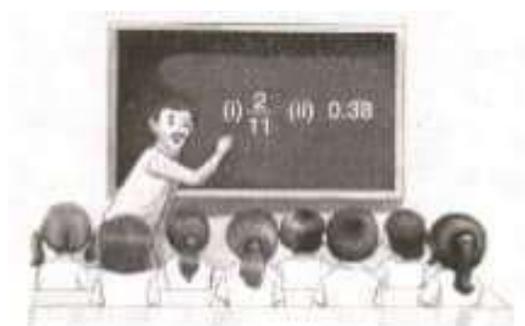
19. If $x = 2 + 3\sqrt{2}$, then find the value of $\left(x + \frac{14}{x}\right)$.

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

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

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

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)

D.A.V. PUBLIC SCHOOL, AIROLI
WORKSHEET: MATHEMATICS
CLASS: IX (2024-25)
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) $\frac{1}{2}$
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 $x^3 + 8y^3$.

15. 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 $x^2 + 4x + 2$.