

KHAITAN PUBLIC SCHOOL, SAHIBABAD
HOLIDAY HOME WORK-2018
CLASS – IX
MATHEMATICS

1. If $x = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ and $y = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}} =$, find $x^2 + y^2$
2. Determine the value of 'a' and 'b'
 - (i) $\frac{\sqrt{2}+\sqrt{3}}{3\sqrt{2}-2\sqrt{3}} = a - b\sqrt{6}$
 - (ii) $\frac{5+2\sqrt{3}}{7+4\sqrt{3}} = a + b\sqrt{3}$
3. Simplify : $\frac{4+\sqrt{5}}{4-\sqrt{5}} + \frac{4-\sqrt{5}}{4+\sqrt{5}}$
4. If $x + \frac{1}{x} = 6$, find (i) $x^2 + \frac{1}{x^2}$ (ii) $x^4 + \frac{1}{x^4}$
5. Write in expanded form: - (i) $\left(\frac{1}{3x} - \frac{2}{5y}\right)^3$ (ii) $216m^2 - 125n^3$
6. If $x - y = 4$, $xy = 21$, find the value of $x^3 - y^3$.
7. Evaluate : (i) 9.9^3 (ii) 10.4^3
8. Find the value of a, if $x + 2$ is a factor of $4x^4 + 2x^3 - 3x^2 + 8x + 5a$
9. If $(x + 1)$ and $(x - 1)$ both one the factor of $ax^3 + x^2 - 2x + b$, find the values of 'a' and 'b'
10. Find the remainder (By division method)
 - (i) $3x^3 + x^2 - 20x + 12 \div (3x - 2)$
 - (ii) $x^3 + 6x^2 + 11x - 6 \div (x^2 - 3x + 2)$
11. Factorise : $(x + 1)^3 + (x - 1)^3$
12. If $x = 3 + \sqrt{8}$, find $x^2 + \frac{1}{x^2}$
13. Simplify : $9^{3/2} - 3 \times 5^0 - \left(\frac{1}{81}\right)^{-1/12}$
14. Express $0.6 + 0.\bar{7} + 0.4\bar{7}$ in the form of p/q where p and q are integers and $q \neq 0$
15. Simplify : $\left(\frac{x^b}{x^c}\right)^{b+c-a} \times \left(\frac{x^c}{x^a}\right)^{c+a-b} \times \left(\frac{x^a}{x^b}\right)^{a+b-c}$
16. Factorize the following:
 - (i) $1 - 64a^3 - 12a + 48a^2$
 - (ii) $8p^3 + \frac{12}{5}p^3 + \frac{6}{25}p + \frac{1}{125}$
17. The three vertices of a rectangle are (3,2), (-4,2) and (-4,5) . Plot these, points and find the coordinates of the fourth vertex.
18. Mark the points (3,3) ,(3,-3) (-3,-3) and (-3, 3) an a graph paper and join these points. Name the figure that you obtain and find its area .
19. Divide the polynomial $p(x) = 3x^4 + 4x^3 + 4x^2 - 8x + 1$ by $q(x) = 3x + 1$. Also find what should be added to 'x' so that it is completely divisible by q (x) .
20. The polynomial $f(x) = x^4 - 2x^3 + 3x^2 - ax + b$ when divided by $(x - 1)$ and $(x + 1)$ leaves remainder 5 and 19 respectively. Find the values of 'a' and 'b'.
21. Given polynomials $(p^{100} - 1)$ and $(p^{101} - 1)$, find $(p + 1)$ is a factor of these or not .
22. What must be added to $x^3 - 3x^2 - 12x + 19$ so that the result is exactly divisible by $x^2 + x - 6$
23. If $5x - 4y = 15$ and $xy = 3$, find the value of $25x^2 + 16y^2$
24. Factorise : (i) $x^2 + 2\sqrt{3}x - 24$ (ii) $2x^2 + 3\sqrt{5}x + 5$
25. Simplify: $(2p + s - t)^2 - (2p - s + t)^2$
26. Evaluate after rationalizing the denominator of $\frac{25}{\sqrt{40} - \sqrt{80}}$. Given that $\sqrt{10} = 3.162$, $\sqrt{5} = 2.236$

27. If $x + y + z = 12$ and $x^2 + y^2 + z^2 = 70$, then find the value of $x^3 + y^3 + z^3 - 3xyz$
28. Verify : $x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2]$ and then factorize $64x^3 + 125y^3 - 64z^3 + 240xyz$
29. R1 and R2 are the remainders obtained when $x^3 + 2x^2 - 5kx - 7$ and $x^3 + kx^2 - 12x + 6$ are divided by $x+1$ and $x-2$ respectively and if $2R1 + R2 = 6$, then find the value of k .
30. Sanjay on his birthday took his friends to a Pizza shop and bought two pizzas. He found a child standing near the shop staring at the shop out of hunger. He planned to give one pizza to him and share the other among his friends. His friends argue that they got less Pizza than that boy. How they concluded the fact ? State the Euclid Axiom to support. What value is Sanjay depicting by doing so ? State any two Axioms other than used above.