

Algebra

Class IX

CBSE and ICSE

If  $a^2 + 4b^2 + 25c^2 = 2ab + 10bc + 5ca$ , prove that  $a = 2b = 5c$ .

If  $121x^2 + kx + 1$  is a perfect square, find the value of  $k$ .

Simplify  $(1 - x)(1 + x)(1 + x^2)(1 + x^4)(1 + x^8)$ .

If  $x = \frac{1}{3-x}$ ,  $x \neq 3$  then find the value of  $x^3 + \frac{1}{x^3}$ .

Factorize  $a^4 + a^4b^4 + b^4$ .

Factorize  $a^3 + 7b^3 + 6ab(a + 2b)$ .

Factorize  $x^3 + x^2 - 2$ .

Factorize  $x^3 + 3x^3 + 3x + 9$

Prove that  $\frac{1}{1+x^{b-a}+x^{c-a}} + \frac{1}{1+x^{a-b}+x^{c-b}} + \frac{1}{1+x^{a-c}+x^{b-c}} = 1$ .

If  $x = y^a$ ,  $y = z^b$  and  $z = x^c$  then find the value of  $abc$ .

If  $2^x = 4^y = 8^z = 2^k$  and  $\frac{1}{2x} + \frac{1}{4y} + \frac{1}{4z} = 4$  then find the value of  $k$ .

Solve for  $x$  and  $y$  : (i)  $25^x = 5^{y-1}$  and  $32^y = 4 \times 8^x$  (ii)  $0.5^{3+x} \times 0.25^{-3y} = 1$  and  $9^{y+2} = (\sqrt{3})^{x+1}$ .

If  $xy^{p-1} = a$ ,  $xy^{q-1} = b$  and  $xy^{r-1} = c$ , prove that  $a^{q-r} \times b^{r-p} \times c^{p-q} = 1$ .

If  $\sqrt[n]{\sqrt[m]{x^l}} = x^t$ , Express  $t$  in terms of  $n$ ,  $m$  and  $l$ .

Using the fact that  $a^n - b^n$  is always divisible by  $a - b$  where  $a, b$  and  $n \in$  set of integers ( $a, b$  and  $n$  are arbitrary). Prove that if  $f(x)$  is a polynomial with integers coefficients and of degree  $m$ ,  $f(a) - f(b)$  is always divisible by  $a - b$ .

If  $x = 1$  is a root of the polynomial equation  $4x^3 - 9x^2 + 3x + 2 = 0$ , factorize it.

If  $a + b + c = 0$ , then simplify the expression  $\frac{a^2+b^2+c^2}{a^3+b^3+c^3} + \frac{2}{3} \left( \frac{1}{a} + \frac{1}{b} + \frac{1}{c} \right)$

Factorize i)  $(x^2 - y^2)(c^2 - d^2) - 4xycd$  ii)  $x^8 + x^4 + 1$  iii)  $4x^2 - 4xy - 8y^2 + 6yz - z^2$

If  $f(x) = \frac{(x-a)(x-b)}{(c-a)(c-b)} + \frac{(x-b)(x-c)}{(a-b)(a-c)} + \frac{(x-c)(x-a)}{(b-c)(b-a)}$  the find the value of  $f(0)$  and  $f(a)$