

1. If $x^2 - 3x + 2$ is a factor of the polynomial $x^4 - ax^3 + b$, then find the values of a and b .
2. If $x^2 + \frac{1}{x^2} = 23$, then find the value of $x^3 + \frac{1}{x^3}$.
3. If a, b, c are real numbers and $a^2 + b^2 + c^2 - ab - bc - ca = 0$, then show that $a = b = c$.
4. Find the value of k , such that $(x - 1)$ is a factor of $5x^3 + 4x^2 - 6x + 2k$.
5. Factorise: $x^4 - 125xy^3$
6. If $(2x - 1)$ is a factor of $4x^3 - 16x^2 + 10x + k$, then find the value of k .
7. If $x = 2y + 6$, find the value of $x^3 - 8y^3 - 36xy - 216$.
8. If $a^2 + b^2 + c^2 = 280$ and $ab + bc + ca = \frac{9}{2}$, then find the value of $(a + b + c)^3$.
9. Factorise: $2x^3 - x^2 - 13x - 6$
10. The polynomial $p(x) = 2x^3 - 3x^2 + ax - 3a + 9$ when divided by $(x + 1)$, leaves the remainder 16. Find the value of a . Also, find the remainder when $p(x)$ is divided by $(x + 2)$.