

The Indian School, Kingdom of Bahrain
Std IX – Mathematics
Polynomials

1. If $x + \frac{1}{x} = 9$, find the value of $x^3 + \frac{1}{x^3}$.
2. Prove that $(x+y)^3 + (y+z)^3 + (z+x)^3 - 3(x+y)(y+z)(z+x) = 2(x^3 + y^3 + z^3 - 3xyz)$
3. Check whether $x = -1$, $x = 3$ are the zeroes of the polynomial $3x^2 + 5x + 2$.
4. Find the quotient & remainder when $x^3 - 6x^2 + 5x - 6$ is divided by $x^2 - x + 2$.
5. Find 'a' for which the polynomial $x^4 - x^3 - 11x^2 - x + a$ is divisible by $x + 3$.
6. Find the value of $(x-a)^3 + (x-b)^3 + (x-c)^3 - 3(x-a)(x-b)(x-c)$ where $a + b + c = 3x$.
7. Without actual division, show that the polynomial $x^3 - 3x^2 - 13x + 15$ is exactly divisible by $x^2 + 2x - 3$.
8. The polynomial $p(x) = ax^3 + 9x^2 + 4x - 8$ when divided by $x + 3$ leaves -20 as remainder. Find the value of a .
9. The polynomials $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$ when divided by $x - 4$ leaves the same remainder. Find the value of a . Also find the remainder.
10. If $x + y + z = 1$, $xyz = -1$ and $xy + yz + zx = -1$, find the value of $x^3 + y^3 + z^3$.
11. Check whether $p(x) = 4x^3 + 4x^2 - x - 1$ is a multiple of $2x + 1$.
12. Find the value of $x^3 + y^3 - 12xy + 64$ when $x + y + 4 = 0$.
13. Find the values of a and b so that the polynomial $x^3 - 10x^2 + ax + b$ is exactly divisible by $x - 1$ as well as $x - 2$.
14. Evaluate: a) $\left(\frac{8}{15}\right)^3 - \left(\frac{1}{3}\right)^3 + \left(\frac{-1}{5}\right)^3$ (b) 98^3 (c) $(23)^3 + (-17)^3 + (-6)^3$
15. Expand : a) $(3x + \frac{3}{2}y - 2c)^2$ b) $(-3a + 2b - 2z)^2$ c) $(\frac{x}{3} + y)^3$
16. Simplify by factorisation: $\frac{x^3 - 4 - x + 4x^2}{x^2 + 3x - 4}$
17. If $8x^3 + 27y^3 = 730$ and $2x^2y + 3xy^2 = 15$, find the value of $2x + 3y$.
18. Factorise:
 - $a^3(b-c)^3 + b^3(c-a)^3 + c^3(a-b)^3$
 - $y^3 + 2y^2 - 5y - 6$
 - $a^3 - 2\sqrt{2}b^3$
 - $\frac{1}{2}y^2 - 3y + 4$
 - $4a^2 - 9b^2 - 2a - 3b$
 - $2\sqrt{2}a^3 + 3\sqrt{3}b^3 + 6\sqrt{3}a^2b + 9\sqrt{2}ab^2$
 - $5x^2 - 16x - 21$
 - $-8\frac{1}{2} + \frac{b^2}{64}$
 - $3x^3 - \frac{1}{3}x$
 - $x^6 - y^6$
 - $4x^3 + 32$
 - $4a^2 - 4b^2 + 4a + 1$
 - $2\sqrt{2}a^3 - 27b^3 + 8c^3 + 18\sqrt{2}abc$
 - $4x^2 + 9y^2 - 12xy$
 - $a^3 - b^3 + 3ab + 1$
 - $(x+2)^2 + (x+2) - 12$
 - $y^3 - 7y + 6$
 - $(3x-2y)^3 + (2y-4z)^3 + (4z-3x)^3$