

Introduction to Algebra

1. In algebra, we substitute number with letters or alphabets to arrive at a solution.
2. We use letters like x,m,a,b,etc. to represent unknown quantities in the equation.

Important Algebraic Formulae

1. $(a + b)^2 = a^2 + 2ab + b^2$
2. $(a - b)^2 = a^2 - 2ab + b^2$
3. $a^2 - b^2 = (a + b)(a - b)$
4. $a^2 + b^2 = (a + b)^2 - 2ab$
 $= (a - b)^2 + 2ab$
5. $(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$
6. $(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$
7. $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
8. $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
9. $(a + b)^2 - (a - b)^2 = 4ab$
10. $(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac$
11. $a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ac)$
12. if $a + b + c = 0$ then $a^3 + b^3 + c^3 = 3abc$
13. $a^4 + a^2 + 1 = (a^2 + a + 1)(a^2 - a + 1)$
14. $a^4 + a^2b^2 + b^4 = (a^2 + ab + b^2)(a^2 - ab + b^2)$
15. $a^4 - b^4 = (a^2 + b^2)(a + b)(a - b)$
16. $a^8 - b^8 = (a^4 + b^4)(a^2 + b^2)(a + b)(a - b)$
17. $a^m \times a^n = a^{m+n}$
18. $\frac{a^m}{a^n} = a^{m-n}$
19. $(a^m)^n = a^{m \times n}$
20. $(ab)^x = a^x b^x$
21. $\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}$
22. $a^{\frac{1}{x}} = \sqrt[x]{a}$