Math Formulas: Factoring and product formulas

Factoring Formulas

1. $$a^2 - b^2 = (a - b)(a + b)$$
2. $$a^3 - b^3 = (a - b)\left(a^2 + ab + b^2\right)$$
3. $$a^3 + b^3 = (a + b)\left(a^2 - ab + b^2\right)$$
4. $$a^4 - b^4 = (a - b)(a + b)\left(a^2 + b^2\right)$$
5. $$a^5 - b^5 = (a - b)\left(a^4 + a^3b + a^2b^2 + ab^3 + b^4\right)$$

Product Formulas

6. $$(a + b)^2 = a^2 + 2ab + b^2$$
7. $$(a - b)^2 = a^2 - 2ab + b^2$$
8. $$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$
9. $$(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$$
10. $$(a + b)^4 = a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$$
11. $$(a - b)^4 = a^4 - 4a^3b + 6a^2b^2 - 4ab^3 + b^4$$
12. $$(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2ac + 2bc$$
13. $$(a + b + c + ...)^2 = a^2 + b^2 + c^2 + ... + 2(ab + ac + bc + ...)$$