2.1 Factoring Formulas

Real numbers: a, b, c
Natural number: n

65. $a^2 - b^2 = (a+b)(a-b)$

66. $a^3 - b^3 = (a-b)(a^2+ab+b^2)$

67. $a^3 + b^3 = (a+b)(a^2-ab+b^2)$

68. $a^4 - b^4 = (a^2-b^2)(a^2+b^2) = (a-b)(a+b)(a^2+b^2)$

69. $a^5 - b^5 = (a-b)(a^4+a^3b+a^2b^2+ab^3+b^4)$

70. $a^5 + b^5 = (a+b)(a^4-a^3b+a^2b^2-ab^3+b^4)$

71. If n is odd, then
$a^n + b^n = (a+b)(a^{n-1} - a^{n-2}b + a^{n-3}b^2 - \ldots - ab^{n-2} + b^{n-1})$.

72. If n is even, then
$a^n - b^n = (a-b)(a^{n-1} + a^{n-2}b + a^{n-3}b^2 + \ldots + ab^{n-2} + b^{n-1})$,

$$a^n + b^n = (a+b)\left(a^{n-1} - a^{n-2}b + a^{n-3}b^2 - \ldots + ab^{n-2} - b^{n-1}\right).$$