

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

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

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