

6.4 Factoring Special Forms

Special forms were discussed in chapter 5 and were given as shortcuts for FOILing specific products. These forms can be used in reverse to factor as well.

Special Forms

- Difference of Squares: $a^2 - b^2 = (a - b)(a + b)$
- Square of a Binomial Sum: $(a + b)^2 = a^2 + 2ab + b^2$
- Square of a Binomial Difference: $(a - b)^2 = a^2 - 2ab + b^2$

Factoring with Difference of Squares

Example 6.4.1

Factor $x^2 - 81$

Example 6.4.2

Factor $36x^2 - 25$

Example 6.4.3

Factor $49 - 4x^{10}$

Example 6.4.4Factor $100x^4 - 9y^6$ **Example 6.4.5**Factor $18x^3 - 2x$ **Example 6.4.6**Factor $72 - 18x^2$

On occasion, we may end up needing to factor repeatedly to get to the final answer.

Example 6.4.7Factor $81x^4 - 16$

Factoring Perfect Square Trinomials

Example 6.4.8Factor $x^2 + 14x + 49$ **Example 6.4.9**Factor $x^2 - 6x + 9$ **Example 6.4.10**Factor $16x^2 - 56x + 49$ **Example 6.4.11**Factor $16x^2 + 40xy + 25y^2$

Factoring the Sum/Difference of Cubes

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

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

Example 6.4.12Factor $x^3 + 27$ **Example 6.4.13**Factor $1 - y^3$ **Example 6.4.14**Factor $125x^3 + 8y^6$