Section 6.7 Factoring by Special Products

# Objective 1: Factoring a Perfect Square Trinomial

A trinomial is a **perfect square trinomial** if it can be written so that its first term is the square of some quantity $a$, its last term is the square of some quantity $b$, and its middle term is twice the product of the quantities $a$ and $b$.

**Perfect square trinomials:**

$$a^{2}+2ab+b^{2}=\left(a+b\right)\left(a+b\right)=\left(a+b\right)^{2}$$

$$a^{2}-2ab+b^{2}=\left(a-b\right)\left(a-b\right)=\left(a-b\right)^{2}$$

Factor: $25y^{2}-20y+4$.

# Objective 2: Factoring the Difference of Two Squares

A binomial is a **difference of two squares** when it is the difference of the square of some quantity $a$ and the square of some quantity $b$.

**Difference of two squares:**

$$a^{2}-b^{2}=(a+b)(a-b)$$

Factor.

|  |  |
| --- | --- |
| a. $b^{4}-1296$  | b. $x^{2}+12x+36-y^{2}$ |
|  |  |

# Objective 3: Factoring the Sum or Difference of Two Cubes

The **sum of two cubes** and the **difference of two cubes** can be factored using the following identities.

**Sum and difference of two cubes:**

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

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

Factor.

|  |  |
| --- | --- |
| a. $w^{3}+125$  | b. $m^{3}-27n^{3}$ |