

Special Factoring Rules for Binomials

Diff. of Squares

Sum of Squares

Diff. of Cubes

Sum of Cubes

Difference of Squares

Recall! $(x+2)(x-2) = x^2 - 4$

$$(x-3)(x+3) = x^2 - 9$$

To factor $a^2 - b^2 = (a+b)(a-b)$.

Ex. Factor:

① $y^2 - 16 = (y+4)(y-4)$

② $25x^2 - 36 = (5x-6)(5x+6)$

③ $5x^2 - 20 = 5(x^2 - 4)$
 $= 5(x+2)(x-2)$

Sum of Squares

Factor $x^2 + 4$

$$(x+2)(x+2) = x^2 + 2x + 2x + 4 = x^2 + 4x + 4$$

$$(x+2)(x-2) = x^2 - 4$$

$x^2 + 4$ is prime.

Sum of squares is prime.

Sum / Diff. of Cubes 1, 8, 27
64
125

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

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

* SOAP for signs

Factor: $x^3 - 8 = (x - 2)(x^2 + 2x + 4)$

$$x^3 + 27 = (x + 3)(x^2 - 3x + 9)$$

$$64y^3 + 125$$

$$= (4y + 5)(16y^2 - 20y + 25)$$

$$\begin{aligned} (4)^3 &= 64 \\ (5)^3 &= 125 \end{aligned}$$