

special product forms

$$(x+y)(x+y) \text{ or } (x+y)^2 = x^2 + 2xy + y^2$$

$$(x-y)(x-y) \text{ or } (x-y)^2 = x^2 - 2xy + y^2$$

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

$$\text{Ex) } (2a+3b)^2 = (2a)^2 + 2(2a)(3b) + (3b)^2 \\ = 4a^2 + 12ab + 9b^2$$

$$\text{Ex) } 9x^2 - 6x + 1 = (3x)^2 - 2(3x)(1) + (1)^2 \\ = (3x-1)^2$$

$$\text{Ex) } (3x+4)(3x-4) = (3x)^2 - (4)^2 \\ = 9x^2 - 16$$

$$\text{Ex) } 25a^2 - 1 = (5a)^2 - (1)^2 \\ = (5a+1)(5a-1)$$

Ex) Factor $(a+b)^2 - c^2$

$$(a+b)^2 - c^2 = (a+b+c)(a+b-c)$$

Ex) Factor $4a^2 - b^2 - 6b - 9$

$$\begin{array}{l} 4a^2 - b^2 - 6b - 9 \\ \times (2a+b)(2a-b) - 3(b+3) \end{array}$$

↑
Don't do this

$$4a^2 - b^2 - 6b - 9$$

$$4a^2 - (b^2 + 6b + 9)$$

$$4a^2 - (b+3)(b+3)$$

$$4a^2 - (b+3)^2$$

$$(2a+b+3)(2a-b-3) \checkmark$$

$$\text{Ex) } x^2 + 2xy + y^2 - 4a^2$$

$$(x+y)(x+y) - (2a)^2$$

$$(x+y)^2 - (2a)^2$$

$$(x+y+2a)(x+y-2a)$$