

Perfect Squares

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$$\begin{aligned} & \cdot (a+b)^2 \\ &= a^2 + 2ab + b^2 \\ & \cdot (a-b)^2 \\ &= a^2 - 2ab + b^2 \end{aligned}$$

How to Use the Perfect Square Identity As a Shortcut in Expansion

Example of Perfect Squares

$(x+1)^2$	$(2x-5)^2$	$(x+2\sqrt{3})^2$
$x^2 + 2x + 1$	$4x^2 - 20x + 25$	$x^2 + 4\sqrt{6}x + 12$
	$4m^2 - 20m + 25$	

Difference of Two Squares

Difference of Two Squares

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

note:

$$\begin{aligned} & (a-b)(a+b) \\ &= a^2 + ab - ab - b^2 \\ &= a^2 - b^2 \end{aligned}$$

Examples of Difference of Two Squares

$(x-1)(x+1)$	$(2m+5)(2m-5)$
$x^2 + x - x - 1$	$4m^2 - 10m + 10m - 25$
$x^2 - 1$	$4m^2 - 25$

$$(\sqrt{3}x + \sqrt{5})(\sqrt{3}x - \sqrt{5})$$

$$3x^2 - \sqrt{15} + \sqrt{15}$$

$$3x^2 - 5$$

Polynomial signs

Quadratic equation	Sign of factors
$ax^2 + bx + c$	Positive sign for both factors + +
$ax^2 - bx + c$	Negative sign for both factors - -
$ax^2 + bx - c$	- for small number, + for large number
$ax^2 - bx - c$	+ for small number, - for large number

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