

### Perfect Squares

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

#### Example of Perfect Squares

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

### Difference of Two Squares

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

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<br>+ +  |
| $ax^2 - bx + c$    | Negative sign for both factors<br>- -  |
| $ax^2 + bx - c$    | - for small number, + for large number |
| $ax^2 - bx - c$    | + for small number, - for large number |

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