

The General Quadratic Trinomial

- 1) Arrange trinomial in the format $ax^2 + bx + c$
- 2) multiply the first term by the last term
- 3) Determine which factors of the product from step 2 add to the middle term
- 4) Replace the middle term ~~from~~ with the chosen factors
- 5) Factor the common term out of the first two terms factor the common term out of the last two terms
- 6) Factor out the new common term

Ex) Factor $2x^2 + 5x + 3$

$$\begin{aligned} 2x^2 + 5x + 3 &\rightarrow 2x^2 \cdot 3 = 6x^2 \\ 2x^2 + 3x + 2x + 3 &\quad \quad \quad \begin{matrix} 3x & 2x \end{matrix} \\ \times (2x+3) + 1(2x+3) & \\ (2x+3)(x+1) & \end{aligned}$$

Ex) Factor $10x^2 + 11x - 6 \rightarrow 10x^2 \cdot (-6) = -60x^2$

$$\begin{aligned} 10x^2 + 15x - 4x - 6 &\quad \quad \quad \begin{matrix} 15x & -4x \end{matrix} \\ 5x(2x+3) - 2(2x+3) & \\ (2x+3)(5x-2) & \end{aligned}$$

Ex) Factor $2x^2 + 9x + 10$

$$\begin{aligned}
 2x^2 + 9x + 10 &\rightarrow 2x^2 \cdot 10 = 20x^2 \\
 2x^2 + 5x + 4x + 10 &\quad \quad \quad 5x \quad \wedge \quad 4x \\
 x(2x+5) + 2(2x+5) & \\
 (2x+5)(x+2) &
 \end{aligned}$$

Ex) Factor $6x^2 - 5x - 4$

$$\begin{aligned}
 6x^2 - 5x - 4 &\rightarrow 6x^2 \cdot -4 = -24x^2 \\
 6x^2 - 8x + 3x - 4 &\quad \quad \quad -8x \quad \wedge \quad 3x \\
 2x(3x-4) + 1(3x-4) & \\
 (3x-4)(2x+1) &
 \end{aligned}$$

Ex) Factor $6x^2 - 31xy + 18y^2$

$$\begin{aligned}
 6x^2 - 31xy + 18y^2 &\rightarrow 6x^2 \cdot 18y^2 = 108x^2y^2 \\
 6x^2 - 27xy - 4xy + 18y^2 &\quad \quad \quad -27xy \quad \wedge \quad -4xy \\
 3x(2x-9y) - 2y(2x-9y) & \\
 (2x-9y)(3x-2y) &
 \end{aligned}$$

$$\begin{array}{r}
 4 \overline{) 18} \\
 \underline{6} \\
 108
 \end{array}$$

$$\begin{array}{r}
 108 \\
 \wedge \\
 54 \quad 2 \\
 \wedge \\
 27 \quad 2 \\
 \wedge \\
 9 \quad 3 \\
 \wedge \\
 3 \quad 3
 \end{array}$$