

1.8 Factoring Quadratics

Part 2

Factoring Trinomials ($a > 1$)

Old Factoring Quadratics

Expanding Trinomials.

$$\textcircled{1} (p-3)(p+6)$$

$$\begin{aligned} &= p^2 + 6p - 3p - 18 \\ &= p^2 + 3p - 18 \end{aligned}$$

$$\textcircled{2} (p+10)(p+1)$$

$$\begin{aligned} &= p^2 + 1p + 10p + 10 \\ &= p^2 + 11p + 10 \end{aligned}$$

$$\textcircled{3} 5(v-4)(v-2)$$

$$\begin{aligned} &= 5(v^2 - 2v - 4v + 8) \\ &= 5(v^2 - 6v + 8) \\ &= 5v^2 - 30v + 40 \end{aligned}$$

Factoring Trinomials.

$$\textcircled{1} \begin{array}{l} p^2 + 3p - 18 \\ (p-3)(p+6) \end{array} \begin{array}{l} \text{---} 1 \cdot 18 \\ 2 \cdot 9 \\ \text{---} \textcircled{-3 \cdot 6} \end{array}$$

$$\textcircled{2} \begin{array}{l} p^2 + 11p + 10 \\ (p+10)(p+1) \end{array} \begin{array}{l} \text{---} 1 \cdot 10 \\ 2 \cdot 5 \end{array}$$

$$\textcircled{3} \begin{array}{l} 5v^2 - 30v + 40 \\ = 5(v^2 - 6v + 8) \\ = 5(v-4)(v-2) \end{array} \begin{array}{l} \text{---} 1 \cdot 8 \\ \text{---} \textcircled{-4 \cdot -2} \end{array}$$

new Factoring Quadratics Part 2

Let's recall the standard form for Quadratics: $ax^2 + bx + c$

Let's consider the product $(3x+1)(x-7)$. Expand the product.

$$\begin{aligned}(3x+1)(x-7) &= 3x^2 - 21x + 1x - 7 \\ &= 3x^2 - 20x - 7.\end{aligned}$$

Standard Form for Trinomials $\Rightarrow ax^2 + bx + c$

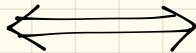
$$ax^2 + \underbrace{bx}_{\text{sum}} + \underbrace{c}_{\text{product}}$$

Guess & Check Method

To factor the trinomial: Get the factors of "a" & "c". Use trial & error to factor.
When $a > 1$.

Before FORWARD (Expand)

$$\begin{aligned}(3x+1)(x-7) \\ = 3x^2 - 21x + 1x - 7 \\ = 3x^2 - 20x - 7\end{aligned}$$



Now BACKWARD (Factor)

$$\begin{aligned}1 \cdot 3 \quad 3x^2 - 20x - 7 \quad 1 \cdot 7 \\ (3x+1)(x-7)\end{aligned}$$

check: $(3x+1)(x-7)$ good!

[Examples] Factor the Quadratics.

$$\textcircled{1} \quad \begin{array}{l} 1 \cdot 2 \quad \quad \quad 1 \cdot 5 \\ 2x^2 + 3x - 5 \\ = (2x + 5)(x - 1) \end{array}$$

$$\textcircled{3} \quad \begin{array}{l} \quad \quad \quad 1 \cdot 9 \\ x^2 + 8x - 9 \\ = (x + 9)(x - 1) \end{array}$$

$$\textcircled{2} \quad \begin{array}{l} 1 \cdot 5 \quad \quad \quad 1 \cdot 3 \\ 5m^2 + 14m - 3 \\ = (5m - 1)(m + 3) \end{array}$$

$$\textcircled{4} \quad \begin{array}{l} 1 \cdot 3 \quad \quad \quad 1 \cdot 12 \\ \quad \quad \quad 2 \cdot 6 \\ \quad \quad \quad 3 \cdot 4 \\ 3v^2 - 5v - 12 \\ = (3v + 4)(v - 3) \end{array}$$