

6-4 Factoring $x^2 + bx + c$

Things to remember:

Start

End

$$x^2 + bx + c$$

$$(x + _)(x + _) \quad \text{Find factors of } c \text{ that add up to } b$$

$$x^2 - bx + c$$

$$(x - _)(x - _) \quad \text{Find factors of } c \text{ that add up to } b$$

$$x^2 + bx - c$$

$$(x + _)(x - _) \quad \text{Find factors of } c \text{ that subtract to } b$$

$$x^2 - bx - c$$

$$(x + _)(x - _) \quad \text{Find factors of } c \text{ that subtract to } b$$

Factor

$$m^2 + 5m + 6$$

$$(m+2)(m+3)$$

$3m+2m=5m$

6

$1 \times 6 \rightarrow 1+6=7$

$2 \times 3 \rightarrow 2+3=5$

$$x^2 + 10xy + 21y^2$$

$$(x+3y)(x+7y)$$

$7xy+3xy=10xy$

21

1×21 $1+21=22$

3×7 $3+7=10$

Factor.

$$x^2 - 9x + 20$$

$$(x - 4)(x - 5)$$

$$\begin{array}{r} -5x + (-4x) = -9x \\ 20 \end{array}$$

$$\begin{array}{ll} 1 \times 20 & 1+20=21 \\ 2 \times 10 & 2+10=12 \\ \textcircled{4 \times 5} & 4+5=9 \end{array}$$

$$x^2 - 10x + 16$$

$$(x - 2)(x - 8)$$

$$\begin{array}{r} 16 \\ 1 \times 16 \\ \textcircled{2 \times 8} \\ 4 \times 4 \end{array} \quad \begin{array}{l} 1+16=17 \\ 2+8=10 \\ 4+4=8 \end{array}$$

Factor

$$x^2 + 3x - 4$$

$$(x + 4)(x - 1)$$

$$\begin{array}{r} 4 \\ 1 \times 4 \\ 2 \times 2 \end{array} \quad \begin{array}{l} -1x + 4x = 3x \\ \textcircled{-1+4} = 3 \\ -4+1 = -3 \\ -2+2 = 0 \end{array}$$

$$m^2 + mn - 56n^2$$

$$(m + 8n)(m - 7n)$$

$$\begin{array}{r} 56 \\ 1 \times 56 \\ \textcircled{-7+8} = 1 \\ 4 \times 14 \\ 7 \times 8 \end{array} \quad \begin{array}{l} -7mn + 8mn = 1mn \\ -4+14=10 \\ -14+4=-10 \\ -8+7=-1 \end{array}$$

Factor.

$$u^2 - 3uv - 10v^2$$

$$(u + \underline{2}v)(u - \underline{5}v)$$

$$\begin{array}{l} \underline{10} \\ 1 \times 10 \quad -1 + 10 = 9 \\ 2 \times 5 \quad -10 + 1 = -9 \\ \quad -2 + 5 = 3 \\ \quad \underline{-5 + 2 = -3} \end{array}$$

$$y^2 - 12yz - 28z^2$$

$$(y + \underline{2}z)(y - \underline{14}z)$$

$$\begin{array}{l} \underline{28} \\ \cancel{-1 \times 28} \quad -2 + 14 = 12 \\ 2 \times 14 \quad \underline{-14 + 2 = -12} \\ 4 \times 7 \quad -4 + 7 = 3 \\ \quad -7 + 4 = -3 \end{array}$$