

Sec. 9.7 Factoring Quadratic Trinomials

Factor:

a. $x^2 + 12x + 35$ $\begin{matrix} F \\ 0+I \\ L \\ 1 \cdot 35 \\ 5 \cdot 7 \end{matrix}$ lx^2

$(x+5)(x+7) \rightarrow x^2 + 7x + 5x + 35$
 $x^2 + 12x + 35$

(Note: Brackets in the original image show the FOIL process: (x+5)(x+7) with 5x and 7x under the x terms, and 12x under the combined middle terms.)

b. $x^2 + 14x + 40$ $\begin{matrix} \times & + \\ 40 & 14 \\ 1 \cdot 40 & \\ 2 \cdot 20 & \\ \boxed{4 \cdot 10} & \rightarrow 4+10 \\ 5 \cdot 8 & \end{matrix}$

$(x+4)(x+10)$

(Note: Brackets in the original image show the FOIL process: (x+4)(x+10) with 4x and 10x under the x terms, and 40 under the constant term.)

c. $x^2 + 22x + 57$ $\begin{matrix} 57 \\ 1 \cdot 57 \\ 3 \cdot 19 \rightarrow 22 \end{matrix}$

$(x+3)(x+19)$

d. $x^2 + 15x + 36$ $\begin{matrix} 36 \\ 1 \cdot 36 \\ 2 \cdot 18 \\ \boxed{3 \cdot 12} \\ 4 \cdot 9 \\ 6 \cdot 6 \end{matrix}$

$(x+3)(x+12)$

e. $a^2 - 10a + 16$ $\begin{matrix} 16 \\ 1 \cdot 16 \\ 2 \cdot 8 \rightarrow -2, -8 \\ 4 \cdot 4 \end{matrix}$

$(a-2)(a-8)$

(Note: An arrow labeled "same" points from the constant term 16 to the circled plus sign in the original image.)

f. $x^2 - 12x - 28$ $\begin{matrix} 28 \\ 1 \cdot 28 \\ 2 \cdot 14 \rightarrow 2-14 \\ 4 \cdot 7 \end{matrix}$

$(x+2)(x-14)$

(Note: An arrow labeled "different" points from the constant term -28 to the circled minus sign in the original image.)

g. $\underline{1}x^2 + 9x + \underline{18}$
 $(x+3)(x+6)$

$$\begin{array}{r} 18 \\ 1 \cdot 18 \\ 2 \cdot 9 \\ \hline 3 \cdot 6 \end{array}$$

h. $x^2 - 10x + 21$
 $(x-3)(x-7)$

$$\begin{array}{r} 21 \\ 1 \cdot 21 \\ \hline 3 \cdot 7 \end{array} \rightarrow -3, -7$$

i. $x^2 + 4x - 21$
 $(x+7)(x-3)$

$$\begin{array}{r} 21 \\ 1 \cdot 21 \\ \hline 3 \cdot 7 \end{array} \quad 7-3 = 4$$

j. $x^2 - x - 20$
 $(x+4)(x-5)$

$$\begin{array}{r} 20 \\ 1 \cdot 20 \\ 2 \cdot 10 \\ \hline 4 \cdot 5 \end{array} \quad 4-5 = -1$$

h. $x^2 + 7x - 14$
 Prime

$$\begin{array}{r} 14 \\ 1 \cdot 14 \\ 2 \cdot 7 \end{array} \rangle \times$$

Factor by grouping "unfolding"

a. $3x^2 - 10x + 3$

$$\begin{array}{r} 3 \cdot 3 \\ \hline 9 \\ \hline 1 \cdot 9 \\ \hline 3 \cdot 3 \end{array} \quad -1, -9$$

$$\underbrace{\frac{3x^2}{x} - \frac{1x}{x}}_{x(3x-1)} - \underbrace{\frac{9x}{-3} + \frac{3}{-3}}_{-3(3x-1)}$$

$$x(3x-1) - 3(3x-1)$$

$$(3x-1)(x-3)$$

b. $6x^2 + 7x - 3$

$$\begin{array}{r} -18 \\ \hline 1 \cdot 18 \\ 2 \cdot 9 \rightarrow -2, +9 \\ 3 \cdot 6 \end{array}$$

$$\underbrace{\frac{6x^2}{2x} - \frac{2x}{2x}}_{2x(3x-1)} + \underbrace{\frac{9x}{3} - \frac{3}{3}}_{3(3x-1)}$$

$$2x(3x-1) + 3(3x-1)$$

$$(3x-1)(2x+3)$$

p. 463
(15 - 25)
odd