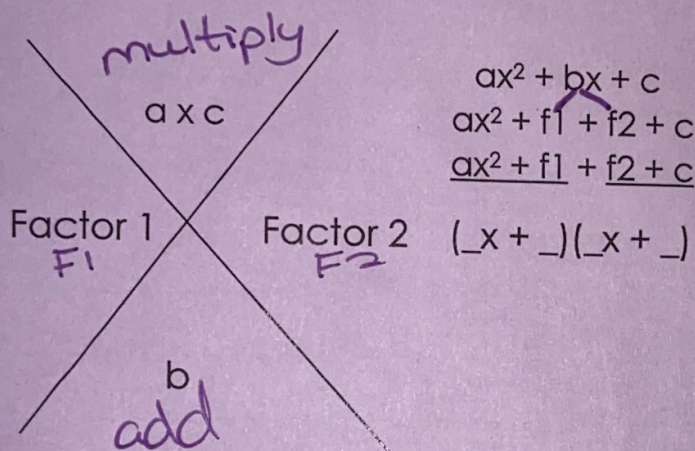


Factoring Trinomials When $a \neq 1$

Factoring Trinomials

$$ax^2 + bx + c$$

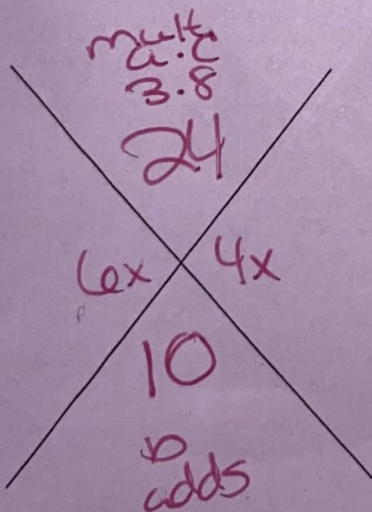
1. Multiply $a \times c$
2. Place b at the bottom
3. What multiplies to $a \times c$, but adds to b ?
4. Place factors on left and right.
5. Rewrite the value of b with Factor 1 & 2
6. Factor by grouping \rightarrow



(4 terms) Grouping method

1. Group 1st 2 terms
Group last 2 terms
2. Factor out GCF from each group
*remaining ()
will match
3. Rewrite () ()
(GCFs) (matching)

a b c
Ex. $3x^2 + 10x + 8$



rewrite
 $3x^2 + 6x + 4x + 8$

$$\frac{(3x^2 + 6x)}{3x} \quad \frac{(4x + 8)}{4}$$

$$3x(x+2) + 4(x+2)$$

$$(3x+4)(x+2)$$

check:
 $3x^2 + 6x + 4x + 8$
 $3x^2 + 10x + 8 \checkmark$

continue

Factor

$$1. \quad \begin{array}{ccc} a & b & c \\ 3x^2 - 16x + 5 \end{array}$$

$$3x^2 - 1x - 15x + 5$$

$$\begin{array}{cc} (3x^2 - x) & (-15x + 5) \\ \underline{\quad \quad} & \underline{\quad \quad} \\ x & -5 \end{array}$$

$$\begin{array}{cc} ac & \\ 15 & \\ -1 & -15 \\ \hline -16 & \\ b & \end{array}$$

$$\begin{array}{cc} 1 \cdot 15 & -1 \cdot -15 \\ 3 \cdot 5 & -3 \cdot -5 \end{array}$$

$$x(3x-1) - 5(3x-1)$$

$$(x-5)(3x-1) \quad \text{or} \quad (3x-1)(x-5)$$

$$2. \quad \begin{array}{ccc} a & b & c \\ 8x^2 - 2x - 15 \end{array}$$

$$8x^2 + 10x - 12x - 15$$

$$\begin{array}{cc} (8x^2 + 10x) & (-12x - 15) \\ \underline{\quad \quad} & \underline{\quad \quad} \\ 2x & -3 \end{array}$$

$$\begin{array}{cc} 8(-15) & \\ -120 & \\ 10x & -12x \\ \hline -2 & \end{array}$$

$$-12 \cdot 10 = -120$$

$$-12 + 10 = -2$$

GCF $\rightarrow 2x \quad 2x \quad -3 \quad -3$

$$\downarrow 2x(4x+5) - 3(4x+5)$$

$$(4x+5)(2x-3)$$

$$3. \quad \begin{array}{ccc} 12x^2 + 15x - 18 \\ \underline{\quad} \quad \underline{\quad} \quad \underline{\quad} \\ 3 \quad a \quad b \quad c \\ 3(4x^2 + 5x - 6) \end{array}$$

$$4x^2 - 3x + 8x - 6$$

$$\begin{array}{cc} (4x^2 - 3x) & (8x - 6) \\ \underline{\quad \quad} & \underline{\quad \quad} \\ x & 2 \end{array}$$

$$\downarrow x(4x-3) + 2(4x-3)$$

$$3(4x-3)(x+2)$$

$$\begin{array}{cc} -24 & \\ -3x & 8x \\ \hline 5 & \end{array}$$

$$1 \cdot 24$$

$$2 \cdot 12$$

$$3 \cdot 8$$

$$4 \cdot 6$$