

14 - 5.3 factoring Trinomials (a=1)

If a polynomial takes the form  $ax^2 + bx + c$  then today we are looking at  $a=1$ .

**Part 1: What are the Missing Numbers?**

Determine what numbers fulfill the following equations:

$$\overset{+2}{\square} + \overset{+3}{\square} = 5$$

$$\square + \square = 6 \quad \begin{matrix} 1,6 \\ 2,3 \end{matrix}$$

$$\overset{+4}{\square} + \overset{+3}{\square} = 7$$

$$\square + \square = 12 \quad \begin{matrix} 1,12 \\ 2,6 \\ 3,4 \end{matrix}$$

$$\overset{+2}{\square} + \overset{-3}{\square} = -1$$

$$\square + \square = -6 \quad \begin{matrix} 1,6 \\ 2,3 \end{matrix}$$

**Part 2: Factoring using the "Box Method"**

Factor the following questions:

$$x^2 + 5x + 6$$

$$\begin{matrix} \overset{+2}{\square} + \overset{+3}{\square} = 5 \\ \square \times \square = 6 \end{matrix} \quad \begin{matrix} 1,6 \\ 2,3 \end{matrix}$$

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

$$x^2 + 7x + 12$$

$$\begin{matrix} \overset{+4}{\square} + \overset{+3}{\square} = 7 \\ \square \times \square = 12 \end{matrix} \quad \begin{matrix} 1,12 \\ 2,6 \\ 3,4 \end{matrix}$$

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

$$x^2 - x - 6$$

$$\begin{matrix} \overset{+2}{\square} + \overset{-3}{\square} = -1 \\ \square \times \square = -6 \end{matrix} \quad \begin{matrix} 1,6 \\ 2,3 \end{matrix}$$

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

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

$$\begin{matrix} \overset{-4}{\square} + \overset{-5}{\square} = -9 \\ \square \times \square = 20 \end{matrix} \quad \begin{matrix} 1,20 \\ 2,10 \\ 4,5 \end{matrix}$$

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

$$x^2 + 0x - 25$$

$$\begin{matrix} \overset{+5}{\square} + \overset{-5}{\square} = 0 \\ \square \times \square = -25 \end{matrix} \quad \begin{matrix} 1,25 \\ 5,5 \end{matrix}$$

$$(x + 5)(x - 5)$$

$$x^2 - 16$$

$$\begin{matrix} x^2 + 0x - 16 \\ \overset{+4}{\square} + \overset{-4}{\square} = 0 \\ \square \times \square = -16 \end{matrix} \quad \begin{matrix} 1,16 \\ 2,8 \\ 4,4 \end{matrix}$$

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

Part 3: Factoring using the "Box Method" and Common Factors

Factor the following questions:

$$3x^2 + 6x + 3$$

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

$$\begin{aligned} &+1 \quad +1 \\ \square + \square &= 2 \\ \square \times \square &= 1 \end{aligned}$$



$$3(x + 1)(x + 1)$$

$$x^2 + 0x - 25$$

No common factor

$$\begin{aligned} &+5 \quad -5 \\ \square + \square &= 0 \\ \square \times \square &= -25 \end{aligned}$$

$$(x + 5)(x - 5)$$

$$2x^3 - 12x^2 + 16x$$

$$2x(x^2 - 6x + 8)$$

$$\begin{aligned} &-2 \quad -4 \\ \square + \square &= -6 \\ \square \times \square &= 8 \end{aligned}$$



$$2x(x - 2)(x - 4)$$

$$\begin{aligned} &1, 8 \\ &2, 4 \end{aligned}$$

$$3x^3y^2 - 6x^2y^2 - 45xy^2$$

$$3xy^2(x^2 - 2x - 15)$$

$$\begin{aligned} &+3 \quad -5 \\ \square + \square &= -2 \\ \square \times \square &= -15 \end{aligned}$$



$$3xy^2(x + 3)(x - 5)$$

$$\begin{aligned} &1, 15 \\ &3, 5 \end{aligned}$$

$$2x^3 - 18x$$

$$2x(x^2 - 9)$$

or

$$2x(x^2 + 0x - 9)$$

$$\begin{aligned} &+3 \quad -3 \\ \square + \square &= 0 \\ \square \times \square &= -9 \end{aligned}$$



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

$$3x^3y + 6x^2y + 12xy$$

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

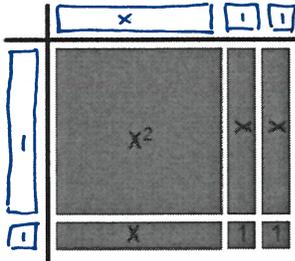
$$\begin{aligned} \square + \square &= 2 \\ \square \times \square &= 4 \end{aligned}$$

Nothing works!  
Can't be factored  
any further.

Part 4: Factoring using Algebra Tiles (Easy)

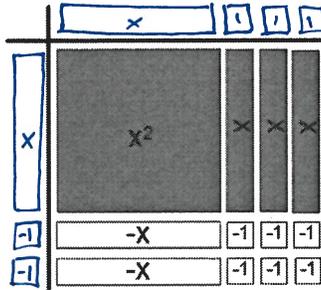
Factor the following questions using Algebra Tiles:

$$x^2 + 3x + 2$$



$$(x+2)(x+1)$$

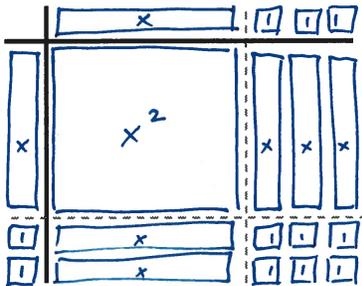
$$x^2 + x - 6$$



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

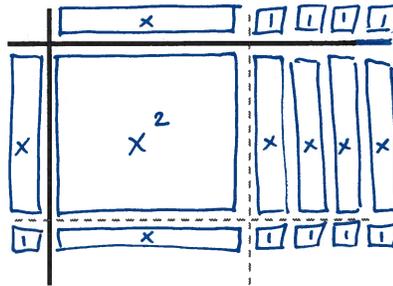
Factor the following questions using Algebra Tiles:

$$x^2 + 5x + 6$$



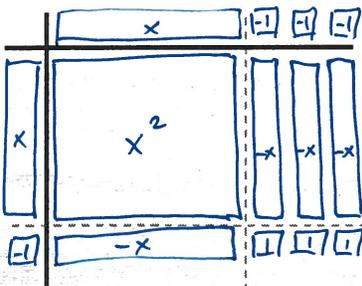
$$(x+3)(x+2)$$

$$x^2 + 5x + 4$$



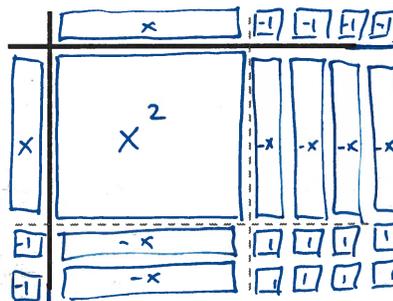
$$(x+4)(x+1)$$

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



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

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

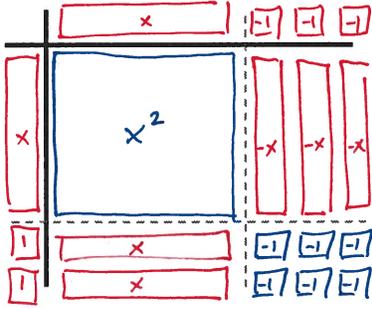


$$(x-4)(x-2)$$

**Part 5: Factoring using Algebra Tiles (Hard) – Adding plus/minus pairs**

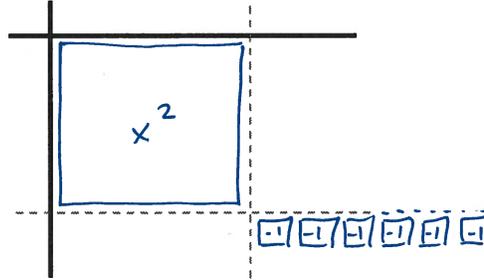
$$x^2 - x - 6$$

Option #1



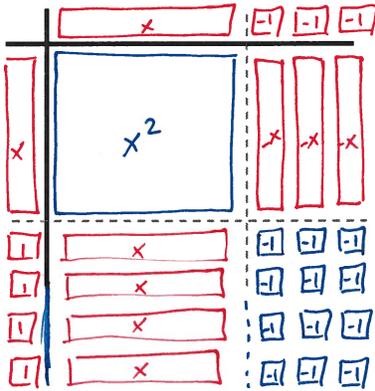
$$(x-3)(x+2)$$

Option #2



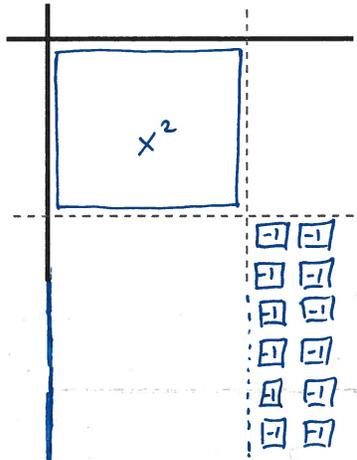
$$x^2 + x - 12$$

Option #1



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

Option #2



Option #3

