

Algebra I

Monday 4-1-13

Class Notes

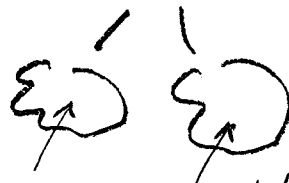
Ch. 7-3 and 7-4 \Rightarrow

* Factoring $ax^2 + bx + c$

* if it can be factored.

Steps: ① Put in standard form
 $ax^2 + bx + c$

② Find 2 "magic numbers"
whose sum = b
AND product = ac



these are the
MAGIC numbers.

③ split the " bx " term
into two magic number terms

EX $4x = -1x + 5x$
 \uparrow \uparrow
 magic numbers

④ * FBG

* If the magic numbers exist,
the $ax^2 + bx + c$ is factorable
and FBG will work.

Examples from Ch. 7-3 & 7-4

(EX) $4x^2 + 19x - 5$

(EX) $2x^2 - 7x - 15$

(EX) $2x^2 + 11x + 12$

(EX) $5x^2 - 14x + 8$

Can you verify your answer?

Yes, multiply your two factors and see if you get the original trinomial.

(EX) $x^2 + 16x + 48$

↑ THERE IS A SHORTCUT
IF $a = +1$

Ex

$$4x^2 + 19x - 5$$

Magic Number Method

$$\text{sum} = b = 19$$

$$\text{prod} = ac = -20$$

$$-1 + 20$$

$$\begin{array}{r} 4/5 \\ 2/10 \end{array}$$

$$-1x + 20x$$

SPLIT MIDDLE TERM

$$(4x^2 - 1x) + (20x - 5)$$

$$x(4x - 1) + 5(4x - 1)$$

Why?
 $x \cdot a + 5a$
 $a(x + 5)$

FACTORS OF TRINOMIAL

$$(4x - 1)(x + 5)$$

$$\text{CK } (4x - 1)(x + 5)$$

$$4x^2 + 20x - 1x - 5$$

$$4x^2 + 19x - 5 \checkmark$$

TRAP

$$(4x^2 + 20x) + (-1x - 5)$$

* * *
* 3rd term -

$$4x(x + 5) + -1(x + 5)$$

$$(x + 5)(4x - 1)$$

$$\textcircled{\text{Ex}} \quad 2x^2 - 7x - 15 = 0$$

$$\text{sum} = b = -7$$

$$\text{prod} = ac = -30$$

$$+3 - 10$$

$$1, 30$$

$$2, 15$$

$$5, 6$$

$$3, 10$$

$$(2x^2 - 10x) + (3x - 15)$$

$$2x(\underline{x - 5}) + 3(\underline{x - 5})$$

$$\boxed{(x - 5)(2x + 3)}$$

$$\checkmark = 0$$

$$\left\{ x = 5, -\frac{3}{2} \right\}$$

Ex

$$2x^2 + 11x + 12$$

$$\text{sum} = b = 11$$

$$\text{prod} = ac = 24$$

$$+3x + 8x$$

$$(2x^2 + 3x) + (8x + 12)$$

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

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

(Ex)

$$5x^2 - 14x + 8$$

$$\text{sum} = -14$$

$$\text{prod} = 40$$

$$\begin{array}{c} \wedge \\ -10 \quad -4 \end{array}$$

$$(5x^2 - 10x) + (-4x + 8)$$

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

$$\boxed{(x - 2)(5x - 4)}$$
 ✓

(Ex)

$$x^2 + 16x + 48$$

$$a = +1$$

IFF SHORTCUT

$$\text{sum} = b = 16$$

$$\text{prod} = ac = 48$$

$$4, 12?$$

$$\begin{array}{c} \wedge \\ +4 \quad +12 \end{array}$$

$$\boxed{(x + 4)(x + 12)}$$
 ✓

Ex 4
Pg 483

$$-2x^2 - 15x - 7$$

$$\text{sum} = b = -15$$

$$\text{prod} = ac = 14$$

$$\begin{array}{c} \diagup \quad \diagdown \\ -1 \quad -14 \end{array}$$

$$(-2x^2 - 1x) + (-14x - 7)$$

↑
change "-" to "+(-"

$$-x(+2x+1) + -7(\underline{2x+1})$$

$$\boxed{(2x+1)(-x-7)}$$

$$\text{or } (2x+1)(-1)(x+7)$$

$$= -1(2x+1)(x+7)$$