7.4 Factoring Trinomial for a ≠ 1

Ex1) Muti-Step Factoring. **(Look for a GCF first, then factor the trinomial.)**

a) $4n^2+12n+8$

(2) (-12)

$= 4(n^2 + 3n + 2)$ $\quad 2+1=(3) \quad -6+2$

Factor Trinomial

$= 4(n+1)(n+2)$

b) $2x^2-8x-24$

$= 2(x^2-4x-12)$

Factor Trinomial

$= 2(x-6)(x+2)$

c) $3a^3+30a^2+63a$

(21)

$7+3=10$

$= 3a(a^2+10a+21) = 3a(a+7)(a+3)$

Factor Trinomial

Try 1) $3y^2 - 15y + 12$

4

$-1 + -4 = -5$

$= 3(y^2 - 5y + 4)$

$= 3(y - 4)(y - 1)$

Try 2) $2b^2 + 10b + 12$

$= 2(b^2 + 5b + 6)$

$= 2(b + 3)(b + 2)$

Try 3) $5x^3 - 15x^2 - 140x$

-28

$-7 + 4 = -3$

$= 5x(x^2 - 3x - 28)$

$= 5x(x - 7)(x + 4)$

Ex2) Factoring Trinomial when a ≠ 1. ax^2+bx+c

a) $5x^2-22x+8$

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

or

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

Step 1: Factors of the 1st #: 5 → $(1x \quad -4)$

Factors of the Last #: 8 → $(5x \quad -2)$

$-20 + -2 = -22$ ✓

Step 2:

Cross multiply & Add to get the middle #.

b) $6x^2+5x+1$

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

or

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

6 → $(3x \quad 1)$

1 → $(2x \quad 1)$

$2 + 3 = 5$ ✓

c) $6a^2 - 5a - 4$

$(3a-4)(2a+1)$

or

$(2a+1)(3a-4)$

6 , −4

(3×-4)
(2×1)

$-8 + 3 = -5$ ✓

d) $10x^2 + 17x + 3$

$=(2x+3)(5x+1)$

10 , 3

2×3
5×1

$15 + 2 = 17$ ✓

e) $3x^2 + 2xy - 8y^2$

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

3 , −8

(1×2)
(3×-4)

$6 + -4 = 2$ ✓

Try 1) $28y^2 + 60y - 25$ (28) (−25)

$= (14y - 5)(2y + 5)$

(14×-5)

(2×5)

$-10 + 70 = 60$

Try 2) $9x^2 - 80xy - 9y^2$ (9) (−9)

$(9x + 1)(x - 9)$

(9×1)

(1×-9)

$1 + -81 = -80$

Try 3) $4x^2 - 17x + 18$ (4) (18)

$= (4x - 9)(x - 2)$

(4×-9)

(1×-2)

$-9 + -8 = -17$ ✓