9.7 Factoring Quadratic Trinomials

- Consider trinomials like ax^2+bx+c when $a=1$
  - c is the "constant" term
  - ✓ The coefficient of the middle term (b) is the sum of constant factors
  - ✓ The constant term (c) is the product of the constant factors

Here's what that looks like going forward...

$(x+2)(x+7)$ ← FOIL

$x^2+2x+7x+14$

$x^2+9x+14$

↑ notice sum of $7+2$

↖ product of $7\cdot 2$

Let's factor now... ← We need factors of c

$x^2+11x+30$

$(x+5)(x+6)$

30	
1	30
2	15
3	10
5	6 ★

Which set gives us a sum of b term?

Yes $5+6$

Be aware that

$(-)\times(-)=(+)$

$(+)\times(+)=(+)$

$(+)\times(-)=(-)$

Example #2 x^2-6x+5 (S = −6, P = 5)

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

5	
1, 5	Which adds to −6
★ −1, −5	

Example #3 x^2-x-12

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

−12	
1, −12	
−1, 12	
−2, 6	
2, −6	
−3, 4	
★ 3, −4	Which adds to −1?

CW Pg 463 (14, 18, 20, 30, 36)

H.W Pg 463 (15-37) odds

9.7 Continued.

Factor Quadratic Trinomials when $a \neq 1$

Recall: Quadratic ax^2+bx+c

We can use guess and check FOIL backwards

or.

"Split the Middle Method" Here's how it works.

Find factors of $a \cdot c$, that sum to b.

Example: $3h^2+2h-16$

$a=3$

$b=2$

$c=-16$

$a \times c = -48$ ← Factors of -48

$-1, 48$ / $1, -48$

$-2, 24$ / $2, -24$

$-3, 16$ / $3, -16$

$-4, 12$ / $4, -12$

$-6, 8$ / $6, -8$

Which pair adds to $+2$

Take those two factors and "Split the middle"

$3h^2+2h-16$

★ $3h^2-6h+8h-16$ ← Rewrite with factors

Now factor by grouping GCF method !!

$(3h^2-6h)(+8h-16)$

$3h(h-2)+8(h-2)$ ★

$(h-2)(3h+8)$ ✓

Ex #2: $3p^2-2p-5$

$3 \times -5 = -15$

$1, -15$

$3, -5$

$3p^2+3p-5p-5$

$(3p^2+3p)(-5p-5)$

$3p(p+1)-5(p+1)$

$(3p-5)(p+1)$

Ex #3: $2n^2+3n-9$

$2 \times -9 = -18$

$1, -18$

$2, -9$

$3, -6$ / $-3, 6$

$2n^2-3n+6n-9$

$(2n^2-3n)(+6n-9)$

$n(2n-3)+3(2n-3)$

$(n+3)(2n-3)$

Ex #4: $3n^2-8n+4$

$3 \times 4 = 12$

$1, 12$

$2, 6$

$-2, -6$

$3n^2-6n-2n+4$

$(3n^2-6n)(-2n+4)$

$3n(n-2)-2(n-2)$

$(3n-2)(n-2)$

Additionals...

5. $2v^2+11v+5$
6. $5n^2+19n+12$
7. $5x^2-18x+9$
8. $4n^2-17n+4$
9. $6x^2+7x-49$
10. $6n^2+5n-6$