

Factoring ax^2+bx+c (Section 2-6)

* When x^2 has a coefficient in a trinomial, it makes the factoring a bit harder. You are welcome to use guess & check, but here is a method that ALWAYS works:

ex: $6x^2 + 13x + 5$ *add/same sign*

$6 \cdot 5 = 30 < \begin{matrix} 30 & 15 & +10 & 6 \\ 1 & 2 & +3 & 5 \\ \hline & & +3 & \end{matrix}$

so... $6x^2 + 10x + 3x + 5$

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

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

ex: $4n^2 - 8n + 3$ *add/same sign*

$4 \cdot 3 = 12 < \begin{matrix} 12 & -6 & 4 \\ 1 & -2 & 3 \\ \hline & -8 & \end{matrix}$

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

$= 2n(2n-3) - 1(2n-3)$

$= (2n-3)(2n-1)$

ex: $10x^2 + 31x - 14$ *sub/opp signs*

$10 \cdot (-14) = -140 < \begin{matrix} 140 & 70 & +35 & 28 & 20 & 14 \\ 1 & 2 & -4 & 5 & 7 & 10 \\ \hline & & +31 & \end{matrix}$

so... $10x^2 + 35x - 4x - 14$

$= 5x(2x+7) - 2(2x+7)$

$= (2x+7)(5x-2)$

ex: $4w^2 - 5w - 6$ *sub/opp signs*

$4 \cdot (-6) = -24 < \begin{matrix} 24 & 12 & -8 & 6 \\ 1 & 2 & +3 & 4 \\ \hline & & -5 & \end{matrix}$

so... $4w^2 - 8w + 3w - 6$

$= 4w(w-2) + 3(w-2)$

$= (w-2)(4w+3)$

* Don't forget the #1 Rule of factoring \rightarrow LOOK FOR THE GCF!

ex: $8x^2 - 36x - 20$

GCF: 4 $\rightarrow 4(2x^2 - 9x - 5)$ *sub/opp signs*

$10 < \begin{matrix} -10 & 5 \\ +1 & 2 \\ \hline -9 & \end{matrix}$

so... $4(2x^2 - 10x + x - 5)$

$= 4[2x(x-5) + 1(x-5)]$

$= 4(x-5)(2x+1)$

ex: $6s^2 + 57s + 72$ *add/same sign*

GCF: 3 \rightarrow $3(2s^2 + 19s + 24)$

48 < 48 24+16 12 8
 1 2+3 4 6
 +19

So... $3(2s^2 + 16s + 3s + 24)$
 $= 3[2s(s+8) + 3(s+8)]$
 $= 3(s+8)(2s+3)$

ex: $20w^2 - 45w + 10$ *add/same sign*

GCF: 5 \rightarrow $5(4w^2 - 9w + 2)$

8 < -8 4
 -1 2
 -9

so... $5(4w^2 - 8w - w + 2)$
 $= 5[4w(w-2) - 1(w-2)]$
 $= 5(w-2)(4w-1)$