

Factoring x^2+bx+c (Section 2-5)

* You must know how to factor to be successful in this class & further math!

** If you have $x^2 \pm bx \oplus c$, this means that both factors of "c" have the same sign & the sign of "b" is the sign of both of those factors. You will also ADD the factors to get "b".

ex: $x^2 \oplus 8x \oplus 15$ $\left\langle \begin{array}{c|c} 1 & 3 \\ \hline 15 & 5 \\ \hline 16 & 8 \end{array} \right.$

both (+) same sign

so... $(x+3)(x+5)$

ex: $x^2 \ominus 11x \oplus 24$ $\left\langle \begin{array}{c|c} 1 & 2 \\ \hline 24 & 12 \\ \hline 8 & 6 \\ \hline 11 & \end{array} \right.$

both (-) same sign

so... $(x-3)(x-8)$

ex: $v^2 \oplus 12v \oplus 20$ $\left\langle \begin{array}{c|c} 1 & 2 \\ \hline 20 & 10 \\ \hline 12 & 5 \end{array} \right.$

both (+) same sign

$(v+2)(v+10)$

ex: $y^2 \ominus 6y \oplus 8$ $\left\langle \begin{array}{c|c} 1 & 2 \\ \hline 8 & 4 \\ \hline 6 & \end{array} \right.$ $(y-2)(y-4)$

both (-) same sign

** If you have $x^2 \pm bx \ominus c$, this means that the factors of "c" have opposite signs & the sign of "b" is the larger factor. Also, you will SUBTRACT the factors to get "b".

ex: $x^2 \oplus 2x \ominus 15$ $\left\langle \begin{array}{c|c} 1 & -3 \\ \hline 15 & 5 \\ \hline 2 & \end{array} \right.$ so... $(x-3)(x+5)$

larger factor is (+) opp signs

ex: $n^2 \oplus 9n \ominus 36$ $\left\langle \begin{array}{c|c} 1 & 2 \\ \hline 36 & 18 \\ \hline -3 & 12 \\ \hline 9 & \end{array} \right.$ $(n-3)(n+12)$

larger one is (+) opp signs

ex: $c^2 \ominus 4c \ominus 21$ $\left\langle \begin{array}{c|c} 1 & +3 \\ \hline 21 & -7 \\ \hline -4 & \end{array} \right.$ so... $(c+3)(c-7)$

larger factor is (-) opp signs

ex: $z^2 \ominus 2z \oplus 18$ $\left\langle \begin{array}{c|c} 1 & 2 & 3 & 4 \\ \hline 48 & 24 & 16 & 12 \\ \hline -8 & -8 & -8 & -8 \\ \hline -2 & \end{array} \right.$ $(z+6)(z-8)$

larger one is (-) opp signs

* Is it possible for a trinomial to not be factorable? YES

ex: $x^2 - x + 2$ $\leftarrow \begin{array}{l} 1 \\ 2 \\ \hline 3 \end{array}$ \therefore Not factorable!

both (-) \uparrow same sign ADD

ex: $x^2 + 12x + 35$ $\leftarrow \begin{array}{l} 1 \\ 35 \\ \hline 36 \end{array}$ $\begin{array}{l} -5 \\ +7 \\ \hline 2 \end{array}$

larger factor is (+) \uparrow opp sign SUBTRACT

* Applications:

ex: A rectangle's area = $x^2 - x - 72$ $\leftarrow \begin{array}{l} 1 \\ 72 \\ \hline 36 \end{array}$ $\begin{array}{l} 2 \\ 4 \\ 6 \\ +8 \\ -9 \\ -1 \end{array}$

opp signs

what are poss. dimensions?

$(x-9)(x+8)$

ex: rectangular rug: $r^2 - 3r - 4$ $\leftarrow \begin{array}{l} 1 \\ -4 \\ \hline -3 \end{array}$ $\begin{array}{l} +1 \\ 2 \\ 2 \end{array}$

opp

what are the dimensions?

$(r+1)(r-4)$

ex: $x^2 + 6xy - 55y^2$ $\leftarrow \begin{array}{l} 1 \\ 55 \\ \hline +6 \end{array}$ $\begin{array}{l} -5 \\ +11 \end{array}$

opp

$(x-5y)(x+11y)$

y's just tag along w/ the factors.

ex: $x^2 + 3xy - 18y^2$ $\leftarrow \begin{array}{l} 1 \\ 18 \\ \hline +6 \end{array}$ $\begin{array}{l} 2 \\ 3 \\ 3 \end{array}$

opp

$(x-3y)(x+6y)$

ex: $w^2 - 14wz + 40z^2$ $\leftarrow \begin{array}{l} 1 \\ 40 \\ \hline -14 \end{array}$ $\begin{array}{l} 2 \\ -4 \\ 5 \\ 8 \end{array}$

same

$(w-4z)(w-10z)$