Why does the criss-cross method work?

$ax^2 + bx + c$ → to be factored.

↓

if this was the result of say,

$(mx+q)(nx+r)$

after opening the brackets we get

$mx \cdot nx + m \cdot r \cdot x + q \cdot n \cdot x + qr$

$m \cdot n\, x^2 + (m \cdot r + qn) \cdot x + qr$

we criss cross this as

mx ⇢ q ⇢ $mx \cdot q = nq \cdot x$

nx ⇢ r → $mx \cdot r = mr \cdot x$ } → (+)

mx^2 $\quad$ $q \cdot r$

In other words, the criss-cross maps the expression into something that reverse-engineers the brackets.