- Factor by Grouping (4 terms)

Steps:

① Use parentheses to group the first two terms and last two terms

② GCF both quantities

③ Check: Both quantities should be the same

④ Write the quantity once and write what is remaining inside parentheses

ex

① $x^3 + 7x^2 - 3x - 21$

$(x^3 + 7x^2) + (-3x - 21)$

② $x^2(x+7) + -3(x+7)$

③ ✓

④ $(x+7)(x^2-3)$

Factoring a Tricky Trinomial

$a \neq 1 \longrightarrow ax^2 + bx + c$

① Multiply the a and c values

② Create a factor table and identify the pair of factors that add to b value

③ Rewrite the original problem but split the b-value into two terms using the #'s ... simplified in Step 2

ex

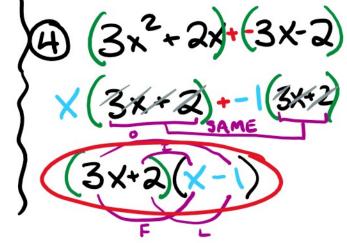$a=3 \quad b=-1 \quad c=-2$

$3x^2 - x - 2$

① $3 \cdot (-2) = -6$

	-6
1	-6
-1	6
2	-3
-2	3

b value

② $2 + (-3) = -1 \longrightarrow$ **2 | -3**

③ $3x^2 - x - 2$

same ↙   ↓split↓   ↓same

$3x^2 + 2x - 3x - 2$

$(3x^2 ...)(3x - ...)$

into two terms using ~~the~~ ~~3x~~
we identified in step 2

④ Factor by Grouping

④ $(3x^2 + 2x) + (-3x - 2)$

$x(\cancel{3x + 2}) + -1(\cancel{3x+2})$
          SAME

$(3x+2)(x-1)$
  F   L

*Check by FOILing

$3x^2 - 3x + 2x - 2$

$3x^2 - x - 2$

• Solving by Factoring

ex Solve for all x.

① Manipulate the equation so that it equals **ZERO**

① $2x^2 - 4x = 6$
$\underline{ -6 -6}$
$2x^2 - 4x - 6 = ☺$

② FACTOR
• GCF • DOTS • TRI • GROUP • TRICKY

② GCF: $2(x^2 - \overset{A}{2}x - \overset{M}{3}) = 0$
TRI: $2(x-3)(x+1) = 0$

③ Set each quantity/factor equal to zero and solve

③ $2 = 0$ $x - 3 = 0$ $x + 1 = 0$
FALSE $\boxed{x = 3}$ $\boxed{x = -1}$