Factoring Trinomials using AC Method

Standard form for a second degree polynomial is $Ax^2 + Bx + C$

Factor $12x^2 + 5x - 2$

1. Create a chart with 2 columns - A* C on one side and B on the other.
2. Factor the A*C in all possible ways and with all possible sign combinations. ⊕ When numbers begin to repeat you can stop.
3. Sum up each pair of factors and put that answer in column B (under the 5)
4. Find the pair that matches the B value at the top of that column.
5. Use the pair of factors to rename the middle term in the trinomial. The order of the 2 terms doesn't matter but the signs do matter. REMEMBER to put the variable with these coefficients.
6. Group these terms into sets of 2 by drawing a bar. Include the operation on the right side of bar.
7. Find the GCF for each pair individually and factor it out. The sign of the third term needs to be the same as the GCF for that pair.
8. Find the common parentheses and factor it out.
9. The second pair of parentheses will be formed with the terms left.

Note: You can check your answer by using foil. If you are correct you will get the original trinomial back.

Step #	Multiply X	Sum + or -
1	A*C	B
1	12*(-2)	5
2	-24	5
	1*(-24)	-23
	-1*24	23
	2*(-12)	-10
	-2*12	10
	3*(-8)	-5
4	-3*8	5
	4*(-6)	-2
	-4*6	2
⊕	6*(-4)	Repeat - stop

Step Number

$12x^2 + 5x - 2$

5. $12x^2 - 3x + 8x - 2$

(step 6) bar (Step 7)

7. $3x(4x - 1) + 2(4x - 1)$

(these should match)

8. $(4x - 1)$

9. $(3x + 2)$

Answer $(4x - 1)(3x + 2)$

Check $12x^2 + 8x - 3x - 2$

$12x^2 + 5x - 2$