3.2 Factoring Quadratic Trinomials part 1

The rest of the unit will be focused on factoring quadratics in **standard form**.

$$\boxed{\text{Standard Form: } ax^2 + bx + c}$$

1) Find the product of $(4x - 1)(2x + 1)$

$8x^2 + 4x - 2x - 1$

$\boxed{8x^2 + 2x - 1}$

Notice that when you first use distribution to multiply that you end up with four terms. Once you combine like terms, you end up with three terms in your final expression.

When we factor quadratic trinomials, we are trying to work backwards from a distributed expression to get the two binomials that it was multiplied from. To do this, we will find a way to "uncombine" the like terms in the middle and then use factoring by grouping.

2) Factor each expression.

Steps
1) Glasses - multiply first and last term
2) Find two numbers that multiply to a·c and add to b (from $ax^2 + bx + c$)
3) Substitute the numbers you found in step 2 for the middle term of the trinomial
4) Factor by grouping

a. $8x^2 + 2x - 1$

$-8x^2$

$4x \quad -2x$

$8x^2 + 4x - 2x - 1$

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

$\boxed{(2x+1)(4x-1)}$

b. $3x^2 + 11x - 4$

$-12x^2$

$12x \quad -1x$

$3x^2 + 12x - 1x - 4$

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

$\boxed{(3x-1)(x+4)}$

* Always look for a GCF first

c. $2n^2 - 7n - 4$

$-8n^2$

$-8n \quad 1n$

$2n^2 - 8n + 1n - 4$

$2n(n-4) + 1(n-4)$

$\boxed{(2n+1)(n-4)}$

d. $5a^2 - 13a - 6$

$-30a^2$

$-15a \quad 2a$

$5a^2 - 15a + 2a - 6$

$5a(a-3) + 2(a-3)$

$\boxed{(5a+2)(a-3)}$

e. $10x^2 + 7x - 12$

$-120x^2$

$10x^2 + 15x - 8x - 12$

$5x(2x+3) - 4(2x+3)$

$\boxed{(2x+3)(5x-4)}$

12	10
20	6
60	2
40	3
30	4
15x	-8x

If you don't know the factors off the top of your head, make a list & pick from there

f. $28m^2 - m - 2$

$-56m^2$

$8m \quad -7m$

$28m^2 - 7m + 8m - 2$

$7m(4m-1) + 2(4m-1)$

$\boxed{(7m+2)(4m-1)}$

You can substitute these in for b in whichever order you want