Factoring

Remember?

Factor this: $x^2 - 7x + 12$

sum product

$$(x - 4)(x - 3)$$

and the best way to ensure that we are right is to FOIL the result

$$x^2 - 5x - 36$$

$$\boxed{(x - 9)(x + 4)}$$

Factor this: $2x^2 - 9x + 10$

we could divide through by 2 and then factor but that would leave us factoring fractions

We can group this into two sets of two terms with the middle term split in a way that generates a common factor

the key is to find the product of the two outside terms

$2 \cdot 10 = 20$

In this case, our terms are -5 and -4

and find the factors of that product that add up to the middle term

-9

$$2x^2 - 9x + 10$$

$$2x^2 \overbrace{- 5x - 4x} + 10$$

Then factor

$$x(2x - 5) - 2(2x - 5)$$

$$\boxed{(2x - 5)(x - 2)}$$

FOIL the result just to be sure

Use grouping to factor this:

$$4x^2 + 4x - 15$$

So we are looking for two numbers whose product is -60

and whose sum is 4

and those two numbers are?

10 and -6

$$4x^2 + 10x - 6x - 15$$

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

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

More Grouping: $3x^3 - 4x^2 - 27x + 36$

we can try grouping the terms by twos in descending degree order

$$\underbrace{(3x^3 - 4x^2)}_{x^2(3x-4)} + \underbrace{(-27x + 36)}_{-9(3x-4)}$$

Now we have (3x-4) as a common factor

$$(x^2 - 9)(3x - 4)$$

And of course there is one more step we can't forget here

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

Factor this: $x^2 - 7xy + 12y^2$

This is not so different from the first problem. Try picturing this without the y terms

$$x^2 - 7x + 12 \longrightarrow (x - 4)(x - 3)$$

$$x^2 - 7xy + 12y^2 \longrightarrow (x - 4y)(x - 3y)$$

and the best way to ensure that we are right is to

FOIL the result

How about this one

$$x^2 - 5xy - 36y^2$$

$$\boxed{(x - 9y)(x + 4y)}$$

And finally let's use these skills to...

Simplify

$$\frac{2x^2+3x-2}{x^2-4}\cdot\frac{x-2}{x+1}$$

Grouping gives us this

$$\frac{2x^2+4x-x-2}{(x+2)(x-2)}\cdot\frac{x-2}{x+1}$$

Difference of squares → (Rule 1 Pg 3)

$$\frac{2x(x+2)-1(x+2)}{(x+2)(x-2)}\cdot\frac{x-2}{x+1}$$

$$\frac{(2x-1)\cancel{(x+2)}}{\cancel{(x-2)}\cancel{(x+2)}}\cdot\frac{\cancel{x-2}}{x+1}$$

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

Don't forget these rules from Algebra

Rules of Factoring: (Page 94)

1. $a^2 - b^2 = (a-b)(a+b)$
2. $a^2 - 2ab + b^2 = (a-b)(a-b)$
3. $a^2 + 2ab + b^2 = (a+b)(a+b)$
4. $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$
5. $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

And if you do forget them... Look them up!

They're on page 94

The End