Lesson 26, Sections 5.3 and 5.4 (part 1)
Factoring out the Greatest Common Factor, Factoring by Grouping
Factoring Trinomials (part 1)

Factoring out the GCF is reversing the **'distributive property'**. It is putting the polynomial back as a product (multiplied).

Factor each polynomial by factoring out the GCF.

1) $x^4 + 8x^3 - 6x^2$

2) $3a^2b^2 + 9a^3b$

3) $-4m^2 - 12m^3n$

4) $-2x^2y - ab$

5) $4xm + 8mn - 16x^2$

Write an equivalent function by factoring.

6) $f(x) = -3x^5 - 9x^4$

7) $G(t) = 4t^5 - t^4$

Sometimes the GCF may be a 'grouping' (parentheses).
Factor out the GCF.

8) $4(x+2y)-3a(x+2y)=$

9) $(3x+1)(x-2)+(2x-4)(x-2)=$

Factoring by Grouping can often be used with a polynomial with 4 terms. Here is an example: Factor $2ax-8a+3x-12$

$\underline{2ax-8a}+\underline{3x-12}$

Group the first 2 terms together,
then the last 2 terms together. Factor the
GCF from each pair. Look for a 'match'.

$=2a(x-4)+3(x-4)$

$=(x-4)(2a+3)$

10) $ab+ac-bd-cd=$

11) $2x^2-nx^2-12n+24=$

12) $3rm-6m+rm^2-18=$

Factoring a trinomial often is **reversing 'FOIL'**. It puts the trinomial back as the product of two binomials.

Form: $x^2 + bx + c$ **Always write terms in descending order!**

Notice: $(x-3)(x+5) = x^2 + 5x - 3x - 15 = x^2 + 2x - 15$ -15 is the product of -3 and 5

2 is the sum of -3 and 5

If a trinomial is of the form $x^2 + bx + c$, find a pair of numbers r and s; such that the product $(r)(s)$ equals c and the sum $r + s$ equals b. Then the factors are $(x + r)(x + s)$. You must watch signs!!!

Factor the following.

1) $x^2 + 6x + 5$ Find a pair of numbers with a product of 5 and a sum of 6.

2) $2a^2 - 20a + 50$ Notice you can take out a GCF of 2 first.

$= 2(a^2 - 10a + 25)$ Now, find a pair of numbers with a product of 25 and a sum of -10.

3) $a^3 - a^2 - 72a$

4) $3x + x^2 - 10$

5) $56 + x - x^2$ Hint: Factor out a GCF of -1 first.