February 28

Fun With Factoring

Greatest Common Factor (GCF):

Ex1 Factor: $\frac{2x^4}{2x^1} - \frac{4x^3}{2x^1} + \frac{6x^1}{2x^1}$ GCF: $2x$

$2x(x^3 - 2x^2 + 3)$ *Remember to put GCF in front!

Ex2 Factor: $\frac{252a^7}{2} + \frac{60a^6}{2} - \frac{108}{2}$ GCF: $2 \cdot 2 \cdot 3 = 12$

$\frac{126a^7}{2} + \frac{30a^6}{2} - \frac{54}{2}$

$\frac{63a^7}{3} + \frac{15a^6}{3} - \frac{27}{3}$

$\boxed{12(21a^7 + 5a^6 - 9)}$

Difference of Two Squares (D.O.T.S.):

Subtraction — Perfect Squares ($\sqrt{\ }$)

Ex 3 Factor: $x^2 - 9$ no GCF

$\sqrt{x^2} = x \quad \sqrt{9} = 3$

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

Ex 4 Factor: $49k^2 - 1$ no GCF

$\sqrt{49k^2} = 7k \quad \sqrt{1} = 1$

$$\boxed{(7k+1)(7k-1)}$$

Ex 5 Factor: $\frac{128m^2}{2} - \frac{50}{2}$ GCF: 2

$$2(64m^2 - 25)$$

$\sqrt{64m^2} = 8m \quad \sqrt{25} = 5$

$$\boxed{2(8m+5)(8m-5)}$$

Not D.O.T.S.

$4x^2 \oplus 9$ ← sum (addition)

$4x^2 - 11$ ← not a perfect square $\sqrt{11} = 3.3166\ldots$

$4x^3 - 9$ ← not x^2 (or even power)

Trinomial By Grouping:

ax^2+bx+c

Ex6 Factor: x^2+6x+8 no GCF

$x^2 \cdot 8 = 8x^2$

$2x + 4x = 6x$

Multiply to 8

2·4	-2·-4
1·8	-1·-8

$\frac{x^2}{x} + \frac{2x}{x} + \frac{4x}{4} + \frac{8}{4}$

$x(x+2) \quad 4(x+2)$

$(x+2)(x+4)$

Ex7 Factor: $6b^2-13b-5$ no GCF

$6b^2 \cdot -5 = -30b^2$

$-15b + 2b = -13b$

Multiply to -30

~~-10·3~~	10·-3
-15·2	15·-2
-5·6	5·-6
-30·1	30·-1

$\frac{6b^2}{3b} - \frac{15b}{3b} + \frac{2b}{1} - \frac{5}{1}$

$3b(2b-5) \quad 1(2b-5)$

$(2b-5)(3b+1)$

Ex8 Factor: $\frac{6x^2}{3} - \frac{39x}{3} + \frac{60}{3}$ GCF: 3

$3(2x^2-13x+20)$

$2x^2 \cdot 20 = 40x^2$

$-8x + -5x = -13x$

Multiply to 40

10·4	-10·-4
2·20	-2·-20
8·5	-8·-5
1·40	-1·-40

GCF matches sign of front term

$\frac{2x^2}{2x} - \frac{8x}{2x} - \frac{5x}{-5} + \frac{20}{-5}$

$2x(x-4) \quad -5(x-4)$

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