Name: **Worksheet(3)**   **Grade:8(A, B)**

Subject: (*Math*)

(*Factoring by grouping*)

Date :

- Goal: To be able to factor polynomials with
  4 terms by grouping

Steps for factoring by grouping:

1. A polynomial must have <u>4 terms</u> to factor by grouping.

$$ex.\ x^3 + x^2 + 2x + 2$$

2. We factor the first two terms and the second two terms separately. Use the rules for GCF to factor these.

The GCF of $x^3 + x^2 \,\big|\, +2x + 2$ The GCF of
$x^3 + x^2$ is x^2. $x^2(x+1) \,\big|\, +2(x+1)$ $2x+2$ is 2

3. Finally, we factor out the "common factor" from both terms. This means we write the $(x+1)$ term in front and the 2 terms left over, x^2+2 , in a separate set of parentheses.

$$(x+1)(x^2 + 2)$$

Factoring by Grouping

Use when there are 4 Terms

Example (1):

$$x^3 + x^2 + x + 1$$

$$(x^3 + x^2) + (x + 1)$$

$$x^2(x + 1) \quad + 1(x + 1)$$

$$(x + 1)(x^2 + 1)$$

Example (2):

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

The GCF of $8x^3 + 2x^2$ is $2x^2$.

$$8x^3 + 2x^2 \mid +12x + 3$$

$$2x^2(4x+1) \mid +3(4x+1)$$

The GCF of $12x + 3$ is 3.

$$= (4x+1)(2x^2+3)$$

Example (3):

$$4x^3 - 6x^2 - 6x + 9$$

The GCF of
$4x^3 - 6x^2$ is $2x^2$.

$$4x^3 - 6x^2 \mid -6x + 9$$
$$2x^2(2x-3) \mid -3(2x-3)$$

The GCF of
$-6x + 9$ is -3.

When you factor a negative out of
a positive, you will get a negative.

$$= (2x-3)(2x^2 - 3)$$

EXERCISE :

Factor completely if possible…

1 $5ab + 10a + 7b + 14$

2 $6m^3 - 12mn + m^2n - 2n^2$

3 $x^3 + 2x^2 + 3x + 6$

4 $4s^2 - s + 12st - 3t$

5 $y - 2y^2 - 18y + 9$

6 $48ab - 90a + 32b - 60$

7 $2m(7m - 3) + 4(3 - 7m)$

8 $15x - 5xy + 6y^2 - 18y$

9 $a(r-t) + m(t-r)$

10 $2t - 14st + 7st^2 - t^2$