

# Ch 9.8

## Factoring By Grouping

## + Factoring a 4-term Polynomial

- To factor by grouping, group into two pairs of 2 terms & factor the GCF from each group. You should now have a common binomial factor.
- Factor the common binomial.

\* Foil to check answer.

Ex 1.  $5t^4 + 20t^3 + 6t + 24$

$$5t^3 \underline{(t + 4)} + 6 \underline{(t + 4)} \qquad (t + 4) (5t^3 + 6)$$

- Sometimes you have to factor out a GCF 1<sup>st</sup>.

Ex 2.  $45m^4 - 9m^3 + 30m^2 - 6m$

GCF:  $3m$        $3m(15m^3 - 3m^2 + 10m - 2)$

$$3m [ 3m^2 \underline{(5m - 1)} + 2 \underline{(5m - 1)} ] \qquad 3m (5m - 1) (3m^2 + 2)$$

+  
- **Try some**

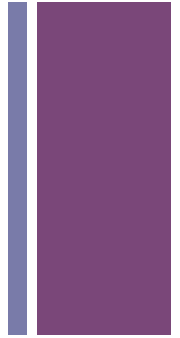
Factor each expression.

1.  $6x^3 + 3x^2 - 4x - 2$

2.  $2z^3 + 12z^2 - 5z - 30$

3.  $8t^4 + 12t^3 + 16t^2 + 24t$

4.  $12y^3 - 20y^2 + 30y - 50$



+  
— **Another Example**

$$\text{Ex. } 6x^4 + 4x^3 - 6x^2 - 4x$$

$$\text{GCF: } 2x \quad 2x(3x^3 + 2x^2 - 3x - 2)$$

$$2x[ \underline{x^2(3x + 2)} - \underline{1(3x + 2)} ]$$

$$2x (3x + 2)(x^2 - 1) \rightarrow \text{diff of sq}$$

$$\mathbf{2x (3x + 2)(x - 1)(x + 1)}$$

# Methods of Factoring



<u>Binomials</u>	<u>Trinomials</u> <u><math>a=1</math></u>	<u>Trinomials</u> <u><math>a&gt;1</math></u>	<u>Polynomials</u>
Check for GCF		Check for GCF	Check for GCF
Check if Difference of Squares	Find factors of $c$ that = $b$	Check if Perfect Square Tri. Find factors of $ac$ that = $b$	Factor by Grouping

