

Factoring by Grouping Notes

For 4 terms, check for factor by grouping

Factor by Grouping

• Example 1:

$$\begin{array}{l} \underbrace{x^3 - 3x^2} - \underbrace{16x + 48} \\ x^2(x-3) - 16(x-3) \\ (x^2 - 16)(x-3) \end{array}$$

Grouping

- Draw a line to group the 1st two terms and the last 2 terms

$$ax + bx + ay + by$$

- Factor by GCF for each pair (see above)

$$x(a + b) + y(a + b)$$

*When 3rd term is negative, factor out a negative # !!!

- Put #/variables in front of parenthesis together and the common factor together as is for final factors

$$(x + y)(a + b)$$

$$\begin{aligned} 1. & (10x^2 + 5x)(4x + 2) \\ & 5x(2x+1) + 2(2x+1) \\ & (5x+2)(2x+1) \end{aligned}$$

$$\begin{aligned} 2. & (x^3 + 2x^2 - 4x - 8) \\ & x^2(x+2) - 4(x+2) \\ & (x^2 - 4)(x+2) \end{aligned}$$

$$\begin{aligned} 3. & c^4 + c^3 - c^2 - c \\ & c^3(c+1) - c(c+1) \\ & (c^3 - c)(c+1) \\ & c(c^2 - 1)(c+1) \end{aligned}$$

$$\begin{aligned} 4. & 3x^3 + 2x^2 - 27x - 18 \\ & x^2(3x+2) - 9(3x+2) \\ & (x^2 - 9)(3x+2) \end{aligned}$$

$$\begin{aligned} 5. & 28ab + 16a + 35b^2 + 20b \\ & 4a(7b+4) + 5b(7b+4) \\ & (4a+5b)(7b+4) \end{aligned}$$

$$\begin{aligned} 6. & 40xy^3 - 10y^2 - 32x^2y + 8x \\ & 10y^2(4xy-1) - 8x(4xy-1) \\ & (10y^2 - 8x)(4xy-1) \\ & 2(5y^2 - 4x)(4xy-1) \end{aligned}$$