Factor a Polynomial Containing Four Terms by Grouping

1. Factor out the GCF, if any, from all four terms.
2. If necessary, rearrange the terms so that the first two terms have a common factor and the last two have a common factor.
3. Factor out the GCF from each group of two terms.
4. Factor out the GCF from the results.

Example 1  Factor by grouping.

a. \(y^2 + 4y + 6y + 24\)  
b. \(3x^2 + 6x + 5x + 10\)

c. \(4a^2 - 6a + 10a - 15\)  
d. \(10x^3 + 20x^2 + 40x^2 + 80x\)

e. \(4x^2 - 2x + 2x - 1\)  
f. \(6b^4 + 4b^2 + 12b^2 + 8\)

\[4x^2 - 20x - 7x + 35\]  
\[3x^3 - 15x^2 + 6x^2 - 30x\]

i. \(8mn + 4m - 6n - 3\)  
j. \(6p^2q^3 - 4pq^2 + 15pq - 10\)