Factor by Grouping

Example 2

Factor $3x^{\scriptscriptstyle 3}$ – $2x^{\scriptscriptstyle 2}$ +6x–4 $% -2x^{\scriptscriptstyle 2}$.

Solution

Working in pairs, factor out the greatest common factor for each pair of terms.

Factor (3x-2), which is common to both groupings. Factoring is complete, since $x^2 + 2$ cannot be factored further. This method can certainly save time, but it will not work for every polynomial.

In order to use the method of grouping to factor a polynomial, the remaining factor from each grouping must be the same after the initial factoring has been completed. **Consider :**

Here the remaining factors (x-1) and (x-2) are not the same, so the next common factor step cannot be carried out.

This cubic cannot be factored by the grouping method.

A cubic polynomial of the form $ax^3 + bx^2 + cx + d$ can be factored by grouping if _____

Example 3

Factor $x^{_5} +\!\! 4x^{_4} -\!\! 2x^{_3} -\!\! 8x^{_2} +\!\! x \!+\!\! 4$.

Solution