Section 2: Dividing and factorising polynomials

Exercise level 1

1. Given that in each case there is no remainder, divide
   (i) $2x^3 - x^2 + 7x + 4$ by $2x + 1$
   (ii) $x^3 + 2x^2 - 3$ by $x - 1$.
   (iii) $2x^2 + x - 1$ by $2x - 1$

2. (i) Show that $x + 1$ is a factor of $2x^3 - 5x^2 - x + 6$.
   (ii) Hence factorise $2x^3 - 5x^2 - x + 6$ completely.
   (iii) Sketch the graph of $y = 2x^3 - 5x^2 - x + 6$

3. $x - 2$ is a factor of the polynomial $x^3 + ax^2 - 4x + 12$.
   (i) Find the value of a.
   (ii) Factorise the polynomial completely.

4. The expression $x - 1$ is a factor of $\mathrm{f}(x) = x^4 + x^3 + bx^2 - 3x + 3$.
   Find the value of b.