

例1 P45

$$(1) x^4 - 2x^3 - 7x^2 + 8x + 12 = 0$$

$$P(x) = x^4 - 2x^3 - 7x^2 + 8x + 12 \quad x \neq 0$$

$$P(-1) = 1 + 2 - 7 - 8 + 12$$

$$= 15 - 15$$

$$= 0$$

よって  $x+1$  は因数に属す

$$x+1 \overline{) \begin{array}{r} x^3 - 3x^2 - 4x + 12 \\ x^4 - 2x^3 - 7x^2 + 8x + 12 \\ \hline x^4 + x^3 \\ \hline -3x^3 - 5x^2 \\ -3x^3 - 3x^2 \\ \hline -4x^2 + 8x \\ -4x^2 - 4x \\ \hline 12x + 12 \end{array}}$$

$$x^4 - 2x^3 - 7x^2 + 8x + 12 = 0$$

$$(x+1)(x^3 - 3x^2 - 4x + 12) = 0$$

$$Q(x) = x^3 - 3x^2 - 4x + 12$$

$$Q(2) = 8 - 12 - 8 + 12$$

$$= 0$$

よって  $x-2$  は因数に属す

$$x-2 \overline{) \begin{array}{r} x^2 - x - 6 \\ x^3 - 3x^2 - 4x + 12 \\ \hline x^3 - 2x^2 \\ \hline -x^2 - 4x \\ -x^2 + 2x \\ \hline -6x + 12 \\ -6x + 12 \\ \hline 0 \end{array}}$$

$$(x+1)(x^3 - 3x^2 - 4x + 12) = 0$$

$$(x+1)(x-2)(x^2 - x - 6) = 0$$

$$(x+1)(x-2)(x-3)(x+2) = 0$$

$\therefore x = -1, 2, 3, -2$

$$(2) 2x^4 + x^3 - 6x^2 + x + 2 = 0$$

$$P(x) = 2x^4 + x^3 - 6x^2 + x + 2 \quad x \neq 0$$

$$P(1) = 2 + 1 - 6 + 1 + 2$$

$$= 0$$

よって  $x-1$  は因数に属す

$$x-1 \overline{) \begin{array}{r} 2x^3 + 3x^2 - 3x - 2 \\ 2x^4 + x^3 - 6x^2 + x + 2 \\ \hline 2x^4 - 2x^3 \\ \hline 3x^3 - 6x^2 \\ 3x^3 - 3x^2 \\ \hline -3x^2 + x \\ -3x^2 + 3x \\ \hline -2x + 2 \\ -2x + 2 \\ \hline 0 \end{array}}$$

$$2x^4 + x^3 - 6x^2 + x + 2 = 0$$

$$(x-1)(2x^3 + 3x^2 - 3x - 2) = 0$$

$$Q(x) = 2x^3 + 3x^2 - 3x - 2$$

$$Q(1) = 2 + 3 - 3 - 2$$

$$= 0$$

よって  $x-1$  は因数に属す

$$x-1 \overline{) \begin{array}{r} 2x^2 + 5x + 2 \\ 2x^3 + 3x^2 - 3x - 2 \\ \hline 2x^3 - 2x^2 \\ \hline 5x^2 - 3x \\ 5x^2 - 5x \\ \hline 2x - 2 \\ 2x - 2 \\ \hline 0 \end{array}}$$

$$(x-1)(2x^3 + 3x^2 - 3x - 2) = 0$$

$$(x-1)(x-1)(2x^2 + 5x + 2) = 0$$

$$\begin{array}{r} 2 \quad 1 \quad -1 \\ 1 \quad \times \quad 2 \rightarrow 4 \\ \hline 5 \end{array}$$

$$(x-1)^2(2x+1)(x+2) = 0$$

$\therefore x = 1, -\frac{1}{2}, -2$