京大理系　1964前期　②

$x-1$) $x^5+x^4-41x^3-33x^2+180x-108$

x^5-x^4

$2x^4-41x^3$

$2x^4-2x^3$

$-39x^3-33x^2$

$-39x^3+39x^2$

$-72x^2+180x$

$-72x^2+72x$

$108x-108$

$108x-108$

0

$x-1$) $x^4+2x^3-39x^2-72x+108$

x^4-x^3

$3x^3-39x^2$

$3x^3-3x^2$

$-36x^2-72x$

$-36x^2+36x$

$-108x+108$

$-108x+108$

0

$x+3$) $x^3+3x^2-36x-108$

x^3+3x^2

$-36x-108$

$-36x-108$

0

$x^5+x^4-41x^3-33x^2+180x-108=(x+3)(x-1)(x-1)(x-6)(x+6)$

すべての式は $x+3$ を含む.

少なくともひとつの式は $(x+3)(x-1)(x-1)$ である.

残り2つの式を $x+3$ で割ったものは

$\begin{cases}(x-1)(x-1)\\(x-6)(x+6)\end{cases}$ —①　$\begin{cases}(x-1)(x-6)\\(x-1)(x+6)\end{cases}$ —②　$\begin{cases}(x-1)(x-6)\\(x-6)(x+6)\end{cases}$ —③　$\begin{cases}(x-1)(x+6)\\(x-6)(x+6)\end{cases}$ —④　$\begin{cases}(x-6)(x+6)\\(x-6)(x+6)\end{cases}$ —⑤

が考えられるが

①⑤は等しい式が2つ現れるので不適

②は最大公約数が $(x+3)(x-1)$ になるので不適

よって　$\begin{cases}(x+3)(x-1)(x-1)\\(x+3)(x-1)(x-6)\\(x+3)(x-6)(x+6)\end{cases}$　$\begin{cases}(x+3)(x-1)(x-1)\\(x+3)(x-1)(x+6)\\(x+3)(x-6)(x+6)\end{cases}$