

최고난도 인수분해 1440제

I

문제

# 1. 사차식의 인수분해

## 1.1 일계수 사차식

$$\begin{aligned} & x^4 - 2x^3 - x^2 - 8x - 20 \\ & x^4 - x^3 - 3x^2 - 2x - 10 \\ & x^4 + 5x^3 + 6x^2 + 25x + 5 \\ & x^4 - 2x^3 - 8x^2 + 11x + 4 \\ & x^4 + x^3 + 5x^2 + 4x + 4 \\ & x^4 + x^3 - 7x^2 - 4x + 6 \\ & x^4 + 5x^3 - 7x^2 - 15x + 12 \\ & x^4 - 6x^3 + 4x^2 + 12x + 4 \\ & x^4 - 5x^3 + 4x^2 + 9x - 15 \\ & x^4 + 3x^3 - 4x^2 + 16x + 8 \\ & x^4 + 3x^2 - 6x - 5 \\ & x^4 + 4x^3 - 5x + 2 \\ & x^4 - x^3 - 13x^2 + 10x + 10 \\ & x^4 + 6x^3 + 18x^2 + 30x + 25 \\ & x^4 - 29x^2 + 4 \\ & x^4 + x^3 + 8x^2 + 4x + 16 \\ & x^4 + 4x^2 + x + 6 \\ & x^4 - x^3 - 10x^2 + 17x - 5 \\ & x^4 + 5x^3 + 6x^2 + 5x + 5 \\ & x^4 - 6x^3 + 18x^2 - 30x + 25 \\ & x^4 + 7x^3 + 12x^2 + 4x - 16 \\ & x^4 + 4x^3 - 5x^2 + 30x - 25 \\ & x^4 + 3x^3 - 6x^2 + 7x - 3 \\ & x^4 - 5x^2 + 2x + 3 \\ & x^4 + 3x^3 + 2x^2 - 3x - 9 \\ & x^4 + 5x^3 + 6x^2 - 7x - 15 \\ & x^4 - x^3 - 7x^2 + 2x + 10 \\ & x^4 - 10x^3 + 20x^2 + 25x + 4 \\ & x^4 - 5x^3 - x^2 - 5x - 2 \\ & x^4 + 2x^3 - 7x^2 - 8x + 15 \\ & x^4 - x^3 + 2x^2 - 4x + 16 \\ & x^4 - 6x^3 - x^2 + 10x + 5 \\ & x^4 + 8x^3 + 16x^2 + x - 2 \\ & x^4 + 3x^3 - 5x^2 - 14x - 6 \end{aligned}$$

$$\begin{aligned} & x^4 + 6x^3 + 10x^2 + 12x - 8 \\ & x^4 - 2x^3 - 4x^2 + 4x + 4 \\ & x^4 - x^3 - 22x^2 + 28x - 8 \\ & x^4 + 7x^3 + 10x^2 - 5x - 3 \\ & x^4 + 10x^3 + 23x^2 - 10x + 1 \\ & x^4 + 3x^3 + 7x^2 + 9x + 12 \\ & x^4 + 5x^3 - 7x + 3 \\ & x^4 - 3x^3 - 7x^2 + 20x - 10 \\ & x^4 - 9x^3 + 21x^2 - 2x - 6 \\ & x^4 - 8x^3 + 11x^2 + 18x + 3 \\ & x^4 - x^3 - 4x^2 - 21x - 15 \\ & x^4 - 4x^2 - 16x - 16 \\ & x^4 - 6x^2 - 21x - 10 \\ & x^4 - 10x^3 + 26x^2 - 5x - 2 \\ & x^4 + 4x^3 + 6x^2 + x - 4 \\ & x^4 - x^3 - 14x^2 + 15x - 3 \\ & x^4 - 3x^3 + 6x^2 - 15x + 25 \\ & x^4 + 8x^3 + 15x^2 - 4x - 2 \\ & x^4 + x^3 - 14x^2 - x + 1 \\ & x^4 + 10x^3 + 23x^2 - 10x - 3 \\ & x^4 - 4x^3 + 2x^2 - x - 2 \\ & x^4 - 9x^3 + 24x^2 - 15x - 5 \\ & x^4 - 5x^2 + 6x - 5 \\ & x^4 - 3x^3 + 6x^2 - 6x + 4 \\ & x^4 + x^3 - 14x^2 + 13x - 3 \\ & x^4 + x^3 - x^2 + 10x + 4 \\ & x^4 - 2x^3 - 5x^2 + 10x - 3 \\ & x^4 + 2x^3 - 18x^2 - 31x - 10 \\ & x^4 + 3x^3 - 4x^2 + 23x + 5 \\ & x^4 - 5x^3 - 7x^2 + 10x + 10 \\ & x^4 - 3x^3 - 4x^2 - 23x + 5 \\ & x^4 - 10x^3 + 30x^2 - 25x + 6 \\ & x^4 - 10x^2 + 4x + 8 \\ & x^4 + 6x^3 + 6x^2 + 17x - 12 \end{aligned}$$

$$\begin{aligned} & x^4 + 2x^3 - 2x^2 + 18x + 5 \\ & x^4 - 2x^3 - 6x^2 + 10x + 5 \\ & x^4 - 4x^3 + x^2 + 4x + 1 \\ & x^4 + 3x^2 + 6x + 10 \\ & x^4 - 6x^3 + 7x^2 - 6x + 1 \\ & x^4 + 2x^3 - 16x^2 - 8x + 16 \\ & x^4 + x^3 - 15x^2 - 2x + 20 \\ & x^4 - 2x^3 - 5x^2 + 6x + 6 \\ & x^4 + 5x^3 - 16x + 8 \\ & x^4 + 5x^3 + 6x^2 + 5x + 1 \\ & x^4 + 2x^2 - 5x - 4 \\ & x^4 + 9x^3 + 20x^2 + x - 1 \\ & x^4 + 5x^3 + 4x^2 - 3x - 1 \\ & x^4 - 7x^3 + 5x^2 + 26x + 10 \\ & x^4 - 20x^2 - 5x + 6 \\ & x^4 - 3x^3 - 3x^2 + 10 \\ & x^4 - 7x^3 + 17x^2 - 26x + 12 \\ & x^4 - 2x^3 - 10x^2 + 20x - 8 \\ & x^4 - 5x^3 + 10x^2 - 7x - 5 \\ & x^4 - 4x^3 + 2x^2 + 11x - 20 \\ & x^4 - x^3 + 4x^2 + 3x + 5 \\ & x^4 + 3x^3 - 11x^2 + 16x - 6 \\ & x^4 + 9x^3 + 20x^2 - 3x - 9 \\ & x^4 - 4x^3 - x^2 + 10x + 4 \\ & x^4 + 7x^3 + 9x^2 - 8x - 4 \\ & x^4 + 4x^3 + 2x^2 + 3x - 6 \\ & x^4 + 4x^3 + 2x^2 + 20x - 15 \\ & x^4 - 8x^3 + 7x^2 + 30x + 15 \\ & x^4 + 2x^3 + 6x^2 + 5x + 4 \\ & x^4 + x^3 - 2x^2 - 5x - 15 \\ & x^4 - 7x^3 + 8x^2 + 13x + 3 \\ & x^4 - 3x^2 + 4x - 3 \\ & x^4 - 7x^3 + 13x^2 - 10 \\ & x^4 + 7x^3 + 6x^2 - 11x + 3 \end{aligned}$$

$$\begin{aligned}
& x^4 + x^3 - 24x^2 - 2x + 4 \\
& x^4 - 2x^3 + 4x^2 - 5x + 12 \\
& x^4 - 2x^3 - 23x^2 + 16x + 15 \\
& x^4 + x^3 + 2x^2 + 3x - 3 \\
& x^4 - 4x^3 - 9x^2 + 20x + 20 \\
& x^4 + 6x^3 + 6x^2 + 21x - 20 \\
& x^4 - 3x^3 - 4x^2 - 9x + 9 \\
& x^4 + 2x^3 - 7x^2 - 16x - 5 \\
& x^4 - 2x^3 - 10x^2 + 13x + 10 \\
& x^4 - 8x^3 + 21x^2 - 20x + 5 \\
& x^4 - 19x^2 + 9 \\
& x^4 - 2x^3 + 9x^2 - 8x + 20 \\
& x^4 - 3x^3 + 7x^2 - 6x + 10 \\
& x^4 + x^3 - 6x^2 + 7x - 5 \\
& x^4 - 3x^3 - 14x^2 + 27x - 5 \\
& x^4 - x^3 - 3x^2 - 14x - 4 \\
& x^4 - 2x^3 - 6x^2 - 20x - 8 \\
& x^4 - 3x^3 - 9x^2 + 16x - 6 \\
& x^4 - 3x^3 - x^2 - 2x + 2 \\
& x^4 + 3x^3 - 11x^2 - 13x + 12 \\
& x^4 + 3x^3 + 8x^2 + 9x + 15 \\
& x^4 - x^3 - 21x^2 + 8x + 20 \\
& x^4 + 2x^3 - 6x^2 - 7x + 12 \\
& x^4 + 3x^3 - 5x^2 + 11x - 6 \\
& x^4 - 5x^3 + 4x^2 + 3x - 1 \\
& x^4 - 3x^3 - 2x^2 - 23x - 15
\end{aligned}$$

$$\begin{aligned}
& x^4 + 8x^3 + 11x^2 - 10x - 5 \\
& x^4 - x^3 - 4x - 16 \\
& x^4 + 4x^3 - 3x^2 + 4x - 4 \\
& x^4 - 18x^2 + 1 \\
& x^4 + 3x^3 - 9x^2 + 4 \\
& x^4 - 10x^3 + 28x^2 - 15x - 10 \\
& x^4 + 6x^3 + 7x^2 - 2x - 3 \\
& x^4 + 5x^3 + 9x^2 + 20x + 20 \\
& x^4 - 5x^3 + 7x^2 - 6x - 12 \\
& x^4 + 5x^3 + 7x^2 + 5x - 6 \\
& x^4 + 7x^3 + 20x^2 + 27x + 15 \\
& x^4 - 5x^3 + x^2 + 10x - 6 \\
& x^4 + 7x^3 + 8x^2 + 5x - 15 \\
& x^4 + 2x^3 + 7x^2 + 6x + 9 \\
& x^4 - 4x^3 - 3x^2 + 14x + 8 \\
& x^4 + 6x^3 + 8x^2 + 8x - 16 \\
& x^4 - 3x^3 + 2x^2 - x - 1 \\
& x^4 - 3x^3 - 7x^2 - 8x - 4 \\
& x^4 - 5x^3 - 2x^2 + 21x + 5 \\
& x^4 - 4x^3 + 13x^2 - 20x + 25 \\
& x^4 + x^3 + 3x^2 + x + 6 \\
& x^4 - 5x^3 + 10x^2 - 25x + 25 \\
& x^4 - 31x^2 + 20x + 5 \\
& x^4 - 8x^3 + 10x^2 + 19x + 6 \\
& x^4 + 2x^2 + 9 \\
& x^4 + 9x^3 + 15x^2 - 22x + 6
\end{aligned}$$

$$\begin{aligned}
& x^4 + 4x^3 + 3x^2 - 8x - 10 \\
& x^4 - 3x^3 + 6x^2 - 3x - 5 \\
& x^4 - 30x^2 - 15x + 4 \\
& x^4 - 5x^3 + 3x^2 + 7x + 2 \\
& x^4 - 6x^3 + 10x^2 - 3x - 6 \\
& x^4 - 3x^2 + 6x - 2 \\
& x^4 - 6x^3 + 7x^2 + 6x - 3 \\
& x^4 - 4x^3 - 4x^2 - 29x - 20 \\
& x^4 - 3x^3 + 6x^2 - 3x + 5 \\
& x^4 - 8x^3 + 18x^2 - 17x - 4 \\
& x^4 - 6x^3 + 3x^2 - 6x - 8 \\
& x^4 - x^3 - 12x^2 + 7x - 1 \\
& x^4 - 3x^3 - 12x^2 - 18x - 8 \\
& x^4 + 4x^2 + 3x + 4 \\
& x^4 + x^3 + 8x^2 + 5x + 25 \\
& x^4 + 4x^3 - 4x^2 - 15x + 12 \\
& x^4 - 5x^3 + 13x^2 - 17x + 12 \\
& x^4 - 5x^3 + x^2 + 6x + 2 \\
& x^4 + 2x^3 - 7x^2 + 10x - 2 \\
& x^4 - 3x^3 - 12x^2 - 25x - 15 \\
& x^4 - 4x^3 + 3x^2 - 6x - 9 \\
& x^4 - 7x^3 + 12x^2 - 4x - 16 \\
& x^4 - 6x^3 + 10x^2 - 3x - 12 \\
& x^4 + 5x^3 + 8x^2 + x - 5 \\
& x^4 + 2x^3 - x^2 + 2x + 1 \\
& x^4 + 2x^3 + 5x^2 + 12x + 15
\end{aligned}$$

## 1.2 일계수가 아닌 사차식

$$\begin{aligned}
& 25x^4 + 10x^3 + 12x^2 + 10x + 3 \\
& 6x^4 + 23x^3 + 4x^2 - 33x + 10 \\
& 6x^4 - 7x^3 + 13x^2 - 7x + 3 \\
& 2x^4 + 7x^3 + 14x^2 + 18x + 15 \\
& 5x^4 + 29x^3 + 50x^2 + 45x + 25 \\
& 25x^4 + 40x^3 + 6x^2 - 8x - 15 \\
& 5x^4 + 10x^3 + 27x^2 + 22x + 8 \\
& 20x^4 - 12x^3 - x^2 - 14x - 3 \\
& 15x^4 + 6x^3 - 13x^2 - 10x - 20 \\
& 16x^4 + 32x^3 + 23x^2 - 15 \\
& 15x^4 - 25x^3 + 11x^2 - 10x + 2 \\
& 4x^4 - 11x^3 + 9x^2 + 16x - 16 \\
& 2x^4 - x^3 + 5x^2 - 2x + 2 \\
& 10x^4 - 6x^3 + 13x^2 - 3x + 4 \\
& 3x^4 + 5x^3 + 15x^2 - x + 10 \\
& 15x^4 - 9x^3 - 5x^2 + 12x - 20 \\
& 5x^4 + 21x^3 - 4x^2 + 6x - 4 \\
& 15x^4 - x^3 - 3x^2 - 4x - 2
\end{aligned}$$

$$\begin{aligned}
& 8x^4 - 14x^3 + 17x^2 - 12x + 4 \\
& 9x^4 - 18x^3 + 8x^2 - 2x - 1 \\
& 16x^4 + 19x^2 + 3x + 12 \\
& 15x^4 - 16x^3 + 6x^2 - 1 \\
& 10x^4 - 23x^2 - 5 \\
& 5x^4 + 10x^3 - 33x^2 + 6x + 9 \\
& 25x^4 + 15x^3 + 20x^2 + 6x + 4 \\
& 2x^4 - 7x^3 + 19x^2 - 21x + 15 \\
& 9x^4 - 18x^3 + 5x^2 + 8x - 6 \\
& 5x^4 - 9x^3 - 5x^2 + 8x + 4 \\
& 6x^4 - 2x^3 - 7x^2 + 29x - 5 \\
& 8x^4 + 6x^3 + 15x^2 + 5x + 6 \\
& 2x^4 + x^3 - 17x^2 + 27x - 12 \\
& 25x^4 - 5x^3 + 18x^2 - 11x - 5 \\
& 8x^4 + 6x^3 - 27x^2 - 24x + 5 \\
& 15x^4 - 2x^3 - 5x^2 - 20x - 12 \\
& 20x^4 - 17x^3 + 10x^2 - 3 \\
& 8x^4 + 6x^3 - 18x^2 - 9x - 1
\end{aligned}$$

$$\begin{aligned}
& 10x^4 + 7x^3 + 11x^2 - x - 20 \\
& 2x^4 + 9x^3 + 2x^2 + 13x + 6 \\
& 5x^4 - 9x^3 - 2x^2 - 11x - 5 \\
& 20x^4 - 11x^3 - 2x^2 + 4x - 1 \\
& 8x^4 + 14x^3 - 2x^2 - 5x - 1 \\
& 12x^4 + 14x^3 + 29x^2 + 14x + 12 \\
& 15x^4 + 5x^3 - 27x^2 + 14x - 2 \\
& 25x^4 + 30x^3 - x^2 - 6x - 3 \\
& 10x^4 - 21x^3 + 10x^2 - 6x - 3 \\
& 4x^4 - 15x^3 + 26x^2 - 24x + 15 \\
& 16x^4 + 20x^3 - 32x^2 - 15x + 15 \\
& 12x^4 - 19x^3 - 16x^2 + 18x + 9 \\
& 9x^4 + 9x^3 + 23x^2 + 11x + 20 \\
& 3x^4 + 8x^3 + 20x^2 + 12x + 5 \\
& 3x^4 + 11x^3 + 6x^2 - 25x - 25 \\
& 20x^4 + 45x^3 + 24x^2 - 1 \\
& 6x^4 + 2x^3 - 25x^2 - 5x + 25 \\
& 4x^4 - 7x^3 - 24x^2 - x + 10
\end{aligned}$$

$12x^4 - 47x^2 - 5x + 25$	$25x^4 - 20x^3 + 10x^2 - 3x + 2$	$4x^4 + 7x^3 - 19x^2 + 2x + 4$
$6x^4 - 23x^3 + 31x^2 - 24x + 4$	$3x^4 + 13x^3 + 13x^2 + 14x + 6$	$4x^4 - 17x^3 + 5x^2 + 9x - 6$
$3x^4 + 15x^3 - 7x^2 + 10x - 6$	$20x^4 + x^3 + 29x^2 + 3x + 10$	$3x^4 - 4x^3 - 5x^2 - 9$
$15x^4 + 8x^3 + 4$	$20x^4 + 6x^3 + 5x^2 + 26x - 15$	$15x^4 + 8x^3 + 2x^2 - 8x + 3$
$6x^4 + 23x^3 + 13x^2 - 14x + 2$	$20x^4 - 28x^3 + 3x^2 - 10x - 25$	$5x^4 - 17x^3 - 27x^2 + 14x + 10$
$6x^4 - 4x^3 + x^2 - 7x - 3$	$6x^4 - x^3 - 33x^2 + 11x + 12$	$10x^4 - 20x^3 + 19x^2 - 9x - 9$
$5x^4 - x^3 + 23x^2 + 18x + 10$	$10x^4 + 14x^3 + 35x^2 + 16x + 15$	$10x^4 + 28x^3 + 25x^2 - 9$
$25x^4 - 30x^3 - 7x - 6$	$6x^4 - x^3 - 25x^2 + 11x + 5$	$9x^4 - 21x^3 - 9x^2 + 23x + 10$
$2x^4 + 5x^3 + x^2 - 10x - 10$	$10x^4 - 30x^3 + 39x^2 - 23x + 6$	$16x^4 - 21x^2 + 25x - 6$
$3x^4 - 7x^3 - 10x^2 + 17x + 15$	$6x^4 + 2x^3 + x^2 - 13x + 15$	$10x^4 - 13x^3 + 21x^2 - 13x + 3$
$9x^4 + 17x^2 - 2x + 8$	$6x^4 - x^3 - 24x^2 - 4x + 3$	$2x^4 + 4x^3 + 5x^2 + 3x - 20$
$15x^4 - 8x^3 - 3x^2 + 2x - 3$	$10x^4 - 30x^3 + 9x^2 + 7x - 6$	$12x^4 - 2x^3 + 27x^2 - 2x + 20$
$2x^4 - 8x^3 - 5x^2 + 26x + 15$	$15x^4 + 12x^3 + 13x^2 + 8x + 2$	$6x^4 - x^3 + 24x^2 + 25$
$16x^4 + 28x^3 + 14x^2 + 11x - 6$	$8x^4 - 16x^3 - 28x^2 + 21x + 10$	$12x^4 + 13x^3 - 21x^2 - 13x + 12$
$25x^4 - 5x^3 - x^2 + 7x - 2$	$8x^4 + 18x^3 + 33x^2 + 21x + 10$	$25x^4 + 5x^3 - 21x^2 - 4x + 2$
$5x^4 - 22x^3 + 11x^2 + 10x + 5$	$2x^4 + 14x^3 + 23x^2 + 9x + 1$	$4x^4 + 24x^3 + 19x^2 + 11x - 3$
$15x^4 - 4x^3 + 5x^2 - 16x - 16$	$3x^4 + 2x^3 - 21x^2 - 16x + 16$	$25x^4 - 5x^3 + 29x^2 - 6x + 12$
$5x^4 - 7x^3 + 21x^2 - 10x + 12$	$9x^4 - 12x^3 + x^2 + 2x - 2$	$4x^4 + 6x^3 - 30x^2 - 15x + 25$
$10x^4 - 27x^3 - 11x^2 + 17x + 6$	$25x^4 + 40x^3 + 50x^2 + 31x + 10$	$20x^4 - 28x^3 + 7x^2 - 2x - 1$
$15x^4 + 2x^3 + 26x^2 + 14x + 15$	$15x^4 + 34x^3 + 23x^2 - 8x - 16$	$9x^4 - 15x^3 + 15x^2 - 20x + 4$
$10x^4 - 12x^3 - 3x^2 - 7x - 15$	$8x^4 - 26x^3 + 18x^2 + 7x - 3$	$15x^4 - 3x^3 + 14x^2 - 4x - 8$
$3x^4 + 10x^3 - x^2 + 2$	$16x^4 - 40x^3 + x^2 + 30x + 5$	$12x^4 + 20x^3 + 37x^2 + 26x + 15$
$8x^4 + 18x^3 - 5x^2 - 9x - 4$	$4x^4 + 24x^3 + 3x^2 - 5x - 15$	$20x^4 - 11x^3 - 26x^2 + 5x + 6$
$5x^4 + 8x^3 + 4x^2 - x - 4$	$2x^4 + x^3 + 8x^2 + 3x + 6$	$15x^4 - 13x^3 + 34x^2 - 12x + 16$
$4x^4 - 15x^3 - 43x^2 - 10x + 8$	$5x^4 + 15x^3 - 13x^2 - 21x - 10$	$12x^4 - 23x^3 - 10x^2 + 18x + 8$
$20x^4 + 7x^3 + 30x^2 + 4x + 16$	$5x^4 + x^3 + 4x^2 - 10x - 4$	$20x^4 + 5x^3 - 14x^2 - 27x - 12$
$2x^4 + 9x^3 + 4x^2 - 9x + 2$	$15x^4 - 5x^3 + 19x^2 - 3x + 6$	$4x^4 - 4x^3 - 19x^2 + 18x - 3$
$12x^4 + 7x^3 - 8x^2 - 28x - 16$	$12x^4 - 5x^3 - 25x^2 - 35x - 12$	$4x^4 + 15x^3 - 35x^2 + 4$
$25x^4 + 5x^3 - 7x^2 - 24x - 12$	$5x^4 - 9x^3 - 6x^2 + 9x + 5$	$20x^4 - 5x^3 - 47x^2 + 5x + 6$
$4x^4 + 13x^3 - 22x^2 + 17x - 6$	$5x^4 - 28x^3 + 24x^2 - x - 2$	$5x^4 - 7x^3 + 13x^2 + 14x - 4$
$10x^4 + 2x^3 + 11x^2 + x + 3$	$10x^4 + 35x^3 + 9x^2 - 25x + 6$	$10x^4 - 3x^3 - 20x^2 - 8x - 15$
$6x^4 + 9x^3 - 7x^2 - 22x - 8$	$10x^4 - 3x^3 - 9x^2 - 3x - 2$	$4x^4 + x^3 - 14x^2 + 5$
$2x^4 + 7x^3 + 11x^2 + 9x + 4$	$4x^4 + 12x^3 + 19x^2 + 15x + 6$	$9x^4 - 6x^3 + 21x^2 - 4x + 15$
$4x^4 - 18x^3 + 23x^2 + 10x - 25$	$2x^4 - 3x^3 + 3x^2 + x - 12$	$20x^4 + 20x^3 - 31x^2 - 15x + 12$
$3x^4 + 14x^3 + 25x^2 + 18x + 3$	$5x^4 + 11x^3 - 34x^2 + 29x - 15$	$9x^4 + 15x^3 - 5x^2 - 6x + 2$
$5x^4 + 26x^3 - 7x^2 + 12x - 9$	$5x^4 - 20x^3 - 12x^2 - 5x + 6$	$15x^4 + 34x^3 + 20x^2 - 13x - 20$
$25x^4 + 10x^3 - 18x^2 + 11x - 10$	$6x^4 - 11x^2 + 3$	$15x^4 + 34x^3 + 5x^2 - 22x - 5$
$20x^4 - 37x^3 + 18x^2 + 6x - 9$	$3x^4 + 4x^3 - 17x^2 + 8x - 1$	$25x^4 + 35x^3 + 5x^2 - 17x - 20$
$12x^4 - 23x^3 + 9x^2 + 16x - 16$	$4x^4 - 14x^3 + 17x^2 + 7x - 20$	$8x^4 - 14x^3 + 19x^2 - 13x + 6$
$4x^4 + 15x^3 - 3x^2 + 21x - 5$	$15x^4 + 34x^3 + 32x^2 + 23x + 4$	$6x^4 - 10x^3 + 23x^2 - 25x + 20$
$6x^4 + 3x^3 + 16x^2 + 13x + 10$	$15x^4 - 15x^3 + 11x^2 + 9x - 12$	$6x^4 - 17x^3 + 14x^2 + 10x - 15$
$2x^4 - 13x^3 + 12x^2 + 26x + 8$	$6x^4 - 4x^3 - 13x^2 + 6x + 6$	$3x^4 + 8x^3 - 25x^2 + 28x - 12$

## 2. 오차식의 인수분해

### 2.1 일계수 오차식

$$\begin{array}{lll} x^5 - 4x^4 + x^3 + 2x^2 + 6x - 4 & x^5 - 6x^4 + 7x^3 + 3x^2 - 6x + 15 & x^5 - 4x^4 - 5x^3 + 7x^2 + 26x + 10 \\ x^5 - 3x^4 + 3x^3 - 4x^2 - 4x + 2 & x^5 - 7x^4 + 7x^3 + 15x^2 - 4x - 6 & x^5 + 3x^4 + x^3 + 5x^2 - 9x + 9 \\ x^5 - 2x^4 - 3x^3 - 3x^2 + 4x - 2 & x^5 + 4x^4 - 2x^3 + 3x^2 - 28x + 20 & x^5 - 6x^4 + 23x^2 + 27x + 9 \\ x^5 + 6x^4 + 4x^3 - 21x^2 - 17x - 3 & x^5 - 3x^4 - 19x^3 + 20x^2 + 5x - 12 & x^5 - 3x^4 - 10x^3 - 34x^2 - 30x - 5 \\ x^5 + x^4 + 11x^2 - 13x - 10 & x^5 + 3x^4 - 5x^3 + 22x^2 + 6x - 15 & x^5 + 6x^4 + 13x^3 + 17x^2 + 10x + 2 \\ x^5 - 4x^3 + 8x^2 - 9x - 5 & x^5 + 2x^4 - 9x^3 + 17x^2 - 20x - 5 & x^5 - 4x^4 + 8x^3 - 3x^2 - 10x + 20 \\ x^5 + x^4 - 3x^3 + 5x^2 - 4x - 4 & x^5 - 2x^4 - 25x^3 + 13x^2 + 10x - 15 & x^5 - 2x^4 - 6x^3 - 2x^2 + 13x + 20 \\ x^5 + x^4 + x^2 - 4x - 6 & x^5 - 4x^4 - 4x^3 - 33x^2 + 16 & x^5 - 8x^4 + 9x^3 + 21x^2 - 5 \\ x^5 + x^4 - 29x^3 + x^2 + 16x - 4 & x^5 - 6x^4 + 30x^2 - 5x - 25 & x^5 - 24x^3 - 8x^2 - 15x - 3 \\ x^5 + 2x^4 - 7x^3 - 9x^2 + 15x + 4 & x^5 + 4x^4 + x^3 - x^2 + 4x - 3 & x^5 + 8x^4 + 12x^3 - 8x^2 - 25x + 15 \\ x^5 + 6x^4 + 12x^3 + 9x^2 + x - 3 & x^5 + 3x^4 - 10x^3 - 16x^2 + 17x - 3 & x^5 + 8x^4 + 14x^3 - 3x^2 - 8x - 2 \\ x^5 + 6x^4 + 6x^3 - 10x^2 - x + 1 & x^5 + 7x^4 + 3x^3 - 21x^2 + 22x - 8 & x^5 - 2x^4 - 18x^3 - 4x^2 - 7x + 3 \\ x^5 - 4x^4 - 7x^3 - 5x^2 - 18x - 9 & x^5 - 2x^4 + 5x^3 - 8x^2 + 6x - 6 & x^5 + 7x^4 + 11x^3 + 13x^2 + 23x - 5 \\ x^5 - 3x^4 - 5x^3 - 17x^2 + 6x + 4 & x^5 - 2x^4 - 6x^3 + 19x^2 - 8x - 10 & x^5 + 7x^4 + 8x^3 - 15x^2 + x - 10 \\ x^5 - 5x^4 + 23x^2 - 25x + 10 & x^5 + 8x^4 + 20x^3 + 19x^2 + 7x - 3 & x^5 + 2x^4 - 3x^3 - 5x^2 + 2x + 2 \\ x^5 - 2x^4 - 2x^3 - 16x^2 - 11x - 15 & x^5 - x^4 - 3x^3 - 4x^2 + 11x - 12 & x^5 - 4x^4 - 5x^3 + 14x^2 - 14x + 4 \\ x^5 - 3x^4 + 2x^3 - 15x^2 + 7x - 4 & x^5 + 4x^4 + 4x^3 + 11x^2 - 10x + 8 & x^5 - x^4 - 18x^3 - x^2 + 25x + 12 \\ x^5 - 5x^4 + x^3 - 6x^2 - 7x - 6 & x^5 + 7x^4 + 9x^3 - 2x^2 - 17x + 6 & x^5 + 4x^4 - 10x^2 - 9x - 6 \\ x^5 + 4x^4 + 6x^3 + 19x^2 + 20x + 6 & x^5 + 3x^4 - 9x^3 + 14x^2 - 6x + 4 & x^5 + 2x^4 - 18x^3 + 2x^2 - x - 1 \\ x^5 - 24x^3 - 20x^2 - 27x - 10 & x^5 - 4x^4 + 2x^3 - 6x^2 + 17x + 15 & x^5 - 10x^4 + 23x^3 + 8x^2 - 5x + 10 \\ x^5 + 8x^4 + 11x^3 - 10x^2 + 15x - 4 & x^5 + 6x^4 + 15x^3 + 13x^2 - 10 & x^5 + 5x^4 + 11x^3 + 15x^2 + 6x + 4 \\ x^5 + 7x^4 + 7x^3 - 8x^2 + 22x - 4 & x^5 - 7x^4 + 16x^3 - 16x^2 + 12x - 4 & x^5 - 5x^4 + 8x^3 - 13x^2 + 7x + 10 \\ x^5 - 3x^4 - 3x^3 - 15x^2 - 8x + 16 & x^5 + x^4 - 9x^3 - 4x^2 + 21x - 4 & x^5 + 8x^4 + 6x^3 - 32x^2 + 35x - 25 \\ x^5 - 4x^4 + 8x^3 - 10x^2 + 7x - 3 & x^5 + 2x^4 - 24x^3 - 6x^2 + 15x + 5 & x^5 - 5x^3 - x^2 - 6x + 3 \\ x^5 - 3x^4 + 2x^3 + 3x^2 - 6x + 2 & x^5 - 5x^4 + 4x^3 - 10x^2 - 18x + 8 & x^5 - 2x^4 + 5x^3 - 17x^2 + 30x - 15 \\ x^5 - 9x^4 + 24x^3 - 20x^2 + 15x + 5 & x^5 + 3x^4 + 18x^2 - 16x - 15 & x^5 + 10x^4 + 24x^3 - 9x^2 - 32x - 12 \\ x^5 - 3x^4 - 4x^3 - 15x^2 - 9x - 10 & x^5 - 2x^3 + 4x^2 - 25x + 25 & x^5 - x^4 - 5x^3 + 21x^2 - 17x - 5 \\ x^5 + x^4 - 9x^3 - 6x^2 + 18x + 10 & x^5 - 5x^4 + 10x^3 - 17x^2 + 10x - 20 & x^5 - x^4 - 8x^3 + 20x^2 - 16 \\ x^5 - 28x^3 + 21x^2 - 24x + 16 & x^5 + x^4 - 21x^3 + 45x^2 + 5x - 25 & x^5 + 7x^4 + 14x^3 + 7x^2 + 5x + 10 \\ x^5 + x^3 - 3x^2 + 10x + 12 & x^5 - 2x^4 - 8x^3 - 8x^2 - 3x - 15 & x^5 - 2x^4 + 4x^3 - 14x^2 + 27x - 15 \\ x^5 + 7x^4 + 10x^3 + 12x^2 - 31x - 15 & x^5 + 3x^4 - 10x^3 + 29x^2 - 11x - 4 & x^5 + 9x^4 + 28x^3 + 40x^2 + 27x + 15 \\ x^5 + 2x^4 + 9x^2 - 25x - 5 & x^5 + 3x^4 - 5x^3 - 13x^2 + 2x + 20 & x^5 + 2x^4 + 4x^3 + 5x^2 - 2x - 2 \\ x^5 + x^4 - 3x^3 - 7x^2 - 3x + 5 & x^5 - 33x^3 + 5x^2 - 9x - 20 & x^5 - 6x^3 - 2x^2 + 3x - 4 \\ x^5 + 7x^4 + 5x^3 - 24x^2 - 19x + 10 & x^5 + 2x^4 - 9x^3 - 16x^2 + 7x + 10 & x^5 + 6x^4 + 4x^3 - 10x^2 - 8x + 8 \end{array}$$

$$\begin{aligned}
& x^5 - 2x^4 - 3x^3 - 9x^2 - 16x + 5 \\
& x^5 + 6x^4 - 5x^3 - 28x^2 + 35x - 10 \\
& x^5 + 6x^4 - x^3 - 14x^2 + x + 4 \\
& x^5 - 4x^4 - 7x^3 + 11x^2 + 22x - 5 \\
& x^5 - 3x^4 - 12x^3 + 11x^2 + 2x - 2 \\
& x^5 - 2x^4 + 6x^3 - x^2 + 16 \\
& x^5 - 3x^4 + 6x^3 - 9x^2 + 11x - 12 \\
& x^5 + 6x^4 + 7x^3 + 24x^2 - 5x - 6 \\
& x^5 - x^4 - 2x^3 + 5x^2 - 3x - 4 \\
& x^5 - 4x^4 + 6x^3 - 12x^2 + 3x - 9 \\
& x^5 + 2x^4 - 4x^3 - 2x^2 - 9x + 3 \\
& x^5 - 4x^4 + 6x^3 - 15x^2 - 8x - 10 \\
& x^5 + 5x^4 + 5x^3 + 20x^2 + 31x + 10 \\
& x^5 - 4x^4 - 11x^3 + 20x^2 + x + 20 \\
& x^5 - 5x^4 + 12x^3 - 16x^2 + 14x - 15 \\
& x^5 - x^4 - 27x^3 + 3x^2 + 37x + 15 \\
& x^5 - 4x^4 + 7x^3 - 14x^2 + 12x - 6 \\
& x^5 + 4x^4 - 11x^3 - 19x^2 + 3x + 2 \\
& x^5 - x^4 - 11x^3 - 10x^2 + 16x - 5 \\
& x^5 - 6x^4 - 3x^3 + 31x^2 - 9 \\
& x^5 + 3x^4 + 2x^3 + 7x^2 - 13x + 12 \\
& x^5 + 2x^4 + 17x^2 + 9x + 15 \\
& x^5 + 2x^4 - 6x^3 + 9x^2 - 6x + 2 \\
& x^5 - 4x^4 - 14x^3 + 16x^2 + 15x + 25 \\
& x^5 - 3x^3 - 4x^2 - 6x + 4 \\
& x^5 + x^4 - 23x^3 - 10x^2 + 18x + 8
\end{aligned}$$

$$\begin{aligned}
& x^5 - 2x^4 - 21x^3 + x^2 + 17x - 6 \\
& x^5 - 6x^4 + 14x^3 - 30x^2 + 25x - 20 \\
& x^5 + x^4 - 9x^3 + 19x^2 - x - 15 \\
& x^5 + 5x^4 - 5x^3 - 11x^2 + 6x - 12 \\
& x^5 - 3x^4 - 10x^3 - 29x^2 - 18x - 4 \\
& x^5 + 3x^4 - 12x^3 - 29x^2 - 19x - 10 \\
& x^5 + x^4 - 20x^3 - 14x^2 - 26x - 5 \\
& x^5 - 24x^3 + 20x^2 + 23x - 5 \\
& x^5 - 4x^4 - 8x^3 + 11x^2 + 15x + 3 \\
& x^5 - 4x^4 - 13x^2 + 16x + 10 \\
& x^5 - 6x^4 + x^3 + 20x^2 - 17x - 4 \\
& x^5 - 6x^4 + 3x^3 + x^2 + 6x + 5 \\
& x^5 - x^4 + 2x^3 - 7x^2 - x - 10 \\
& x^5 - 3x^4 + x^3 - 7x^2 + 4x - 4 \\
& x^5 + 4x^4 + 4x^3 + 10x^2 - 3x + 9 \\
& x^5 + 2x^4 - 4x^3 + 12x^2 - 9x + 6 \\
& x^5 - 2x^4 - 2x^3 - 4x^2 - 3x - 2 \\
& x^5 - 2x^4 - x^3 + x^2 - 7x - 2 \\
& x^5 + 3x^4 + 6x^3 + 2x^2 + 2x - 5 \\
& x^5 - x^4 - 13x^3 + 12x^2 + 12x - 5 \\
& x^5 - 2x^4 - 5x^3 - 8x^2 - 6x + 4 \\
& x^5 - 4x^4 - 11x^3 + 13x^2 + 3x + 20 \\
& x^5 + 4x^4 + x^3 - 6x^2 - 6x - 4 \\
& x^5 + 4x^4 - 7x^3 - 12x^2 - 7x - 12 \\
& x^5 - 4x^4 - 14x^3 + 13x^2 + 30x + 10 \\
& x^5 - 8x^3 - 2x^2 + 9x + 12
\end{aligned}$$

$$\begin{aligned}
& x^5 - 22x^3 - 3x^2 - 12x - 20 \\
& x^5 + x^4 - 18x^3 + 35x^2 - 7x - 10 \\
& x^5 - 4x^4 - 4x^3 + 6x^2 - 3x + 1 \\
& x^5 - 7x^4 + 6x^3 + 19x^2 + 12x + 4 \\
& x^5 + x^4 - 5x^3 + 8x^2 + 9x + 4 \\
& x^5 + 3x^4 - 4x^3 + 13x^2 + 29x + 12 \\
& x^5 + x^4 + 6x^2 - 24x - 5 \\
& x^5 + 5x^4 - 4x^3 - 5x^2 + 4x - 10 \\
& x^5 - 4x^4 - x^3 - 15x^2 + 12 \\
& x^5 + 4x^4 + 11x^3 + 15x^2 + 18x + 5 \\
& x^5 + 8x^3 + 4x^2 + 16x + 16 \\
& x^5 + 3x^4 - 5x^3 - 18x^2 - 22x - 8 \\
& x^5 + 2x^4 - 7x^3 + 27x^2 - 22x + 20 \\
& x^5 + 7x^4 + 17x^3 + 18x^2 + 10x + 2 \\
& x^5 + 5x^4 - 7x^3 - 14x^2 + 17x - 4 \\
& x^5 - 7x^4 + 19x^3 - 21x^2 - 5x + 25 \\
& x^5 - 3x^4 + 10x^2 - 18x - 15 \\
& x^5 - 5x^4 - 5x^3 + 13x^2 + 6x + 6 \\
& x^5 - 2x^4 - 23x^3 - 3x^2 + 30x + 15 \\
& x^5 - 7x^4 + 12x^3 + x^2 - x + 2 \\
& x^5 - 6x^4 + 4x^3 + 9x^2 + 5x + 1 \\
& x^5 - 11x^3 - 4x^2 + 14x - 4 \\
& x^5 + 6x^4 + 2x^3 - 15x^2 + 10x - 2 \\
& x^5 - x^4 - 18x^3 - 7x^2 + 17x - 4 \\
& x^5 - 6x^4 + 5x^3 + 9x^2 + 4x - 3 \\
& x^5 + 2x^4 - 25x^3 - 15x^2 + 40x + 25
\end{aligned}$$

## 2.2 일계수가 아닌 오차식

$$\begin{aligned}
& 8x^5 + 22x^4 + 19x^3 + 9x^2 - x - 1 \\
& 20x^5 + 7x^4 - 13x^3 + 21x^2 - 4x - 10 \\
& 25x^5 - 25x^4 - 31x^3 + 18x^2 + 6x - 5 \\
& 3x^5 - 4x^4 - 24x^3 - 14x^2 + 13x + 15 \\
& 20x^5 + 25x^4 - 11x^3 - 29x^2 - 14x - 2 \\
& 15x^5 - 10x^4 - 49x^3 + 20x^2 + 29x - 12 \\
& 4x^5 - 19x^4 + x^3 - 7x^2 + 6x - 3 \\
& 8x^5 + 12x^3 - 5x^2 + x - 4 \\
& 6x^5 + x^4 - 20x^3 - 46x^2 - 35x - 10 \\
& 2x^5 - 2x^4 - 3x^3 + 6x^2 - 3x - 2 \\
& 20x^5 + 4x^4 + 27x^3 + 23x^2 + 9x + 15 \\
& 2x^5 - 12x^4 + 18x^3 - 15x^2 + x + 3 \\
& 15x^5 + 5x^4 - 35x^3 + 9x^2 - 8x + 6 \\
& 4x^5 + 6x^4 + 14x^3 + 23x^2 + 22x + 8 \\
& 20x^5 + 2x^4 - 45x^3 - 18x^2 + 10x + 25 \\
& 12x^5 + 29x^4 + 8x^3 - 17x^2 - 27x - 15 \\
& 15x^5 + 40x^4 + 55x^3 + 34x^2 + 5x - 6 \\
& 12x^5 - 27x^4 + 17x^3 - 5x^2 + 3x - 2
\end{aligned}$$

$$\begin{aligned}
& 12x^5 + 5x^4 - 8x^3 - 14x^2 - 18x + 15 \\
& 4x^5 - 12x^4 - 5x^3 + 34x^2 - 17x - 5 \\
& 5x^5 + 21x^4 - 45x^3 + 16x^2 - 25 \\
& 3x^5 - 16x^4 + 23x^3 - 18x^2 + 5x + 10 \\
& 16x^5 - 36x^3 + 4x^2 + 19x - 6 \\
& 25x^5 + 30x^4 - x^3 + 4x^2 - 2x - 8 \\
& 6x^5 - 17x^4 + 3x^3 - 23x^2 + x - 10 \\
& 3x^5 - x^4 - 12x^3 - 3x^2 + 16x + 6 \\
& 6x^5 - 5x^4 - 27x^3 + 18x^2 - 28x + 16 \\
& 8x^5 - 2x^4 - 22x^3 - 13x^2 + 14x + 12 \\
& 3x^5 - 12x^4 - 4x^3 + 8x^2 - 13x + 3 \\
& 12x^5 + 3x^4 - 19x^3 - 16x^2 + x + 3 \\
& 12x^5 + 13x^4 - 24x^3 - 23x^2 + 12x + 9 \\
& 20x^5 + 31x^4 - 21x^3 - 6x^2 + 25x - 25 \\
& 3x^5 - 7x^4 - 18x^3 - 25x^2 - 19x - 6 \\
& 6x^5 + 19x^4 + 17x^3 + 21x^2 + 8x + 6 \\
& 2x^5 + 5x^4 + 12x^3 + 12x^2 + 3x - 4 \\
& 25x^5 - 25x^4 + 14x^3 - 39x^2 + 12x + 10
\end{aligned}$$

$$\begin{aligned}
& 5x^5 - 16x^4 + 10x^3 - 12x^2 + 17x - 5 \\
& 20x^5 - 24x^4 - 26x^3 + 37x^2 + 7x - 15 \\
& 4x^5 - 2x^4 + 12x^3 - 13x^2 + 5x - 20 \\
& 12x^5 + 12x^4 + 5x^3 - 7x^2 - 2x - 10 \\
& 10x^5 + 18x^4 + 17x^3 + 31x^2 + 11x - 15 \\
& 6x^5 + 2x^4 - 4x^3 - 5x^2 + 35x - 25 \\
& 3x^5 - 15x^4 - 4x^3 + 5x^2 - 4x + 10 \\
& 9x^5 + 21x^4 + 7x^3 - 8x^2 - 10x + 2 \\
& 5x^5 + 5x^4 + 24x^3 + 21x^2 - 5x - 20 \\
& 15x^5 + 12x^4 + 14x^3 - 10x^2 - 7x - 4 \\
& 8x^5 - 30x^3 + 34x^2 - 11x - 4 \\
& 25x^5 + 5x^4 + 28x^3 - 16x^2 - 16 \\
& 6x^5 - 8x^4 + 15x^3 - x^2 + 4x + 4 \\
& 15x^5 - 2x^4 + 15x^3 + 3x^2 - 16x + 3 \\
& 6x^5 - 3x^4 + 15x^3 - 10x^2 + 5x - 25 \\
& 12x^5 + 11x^4 - 17x^3 - 12x^2 - 20x + 16 \\
& 4x^5 + 4x^4 - 15x^3 + 14x^2 + 6x - 8 \\
& 12x^5 + 8x^4 + 7x^3 + 10x^2 - 12x - 12
\end{aligned}$$

$$\begin{aligned}
&8x^5 + 2x^4 - 2x^3 - 5x^2 + 8x - 3 \\
&15x^5 + 7x^4 + 10x^3 - 15x^2 - x + 2 \\
&3x^5 - 14x^4 + 34x^3 - 34x^2 + 11x + 15 \\
&4x^5 - 19x^4 - 16x^3 - 12x^2 + 17x + 12 \\
&8x^5 + 6x^4 - 15x^3 + 25x^2 + 25x - 25 \\
&10x^5 - 12x^4 + 29x^3 - 2x^2 + 4x + 1 \\
&15x^5 + 13x^4 - 47x^3 + 12x^2 - 4x - 16 \\
&25x^5 - 15x^4 - 9x^3 - 11x^2 - 28x - 10 \\
&6x^5 - 7x^4 - 17x^3 + 15x^2 + 10x - 8 \\
&4x^5 - 21x^4 - x^3 + 36x^2 + 25x + 5 \\
&25x^5 - 5x^4 - 36x^3 - 12x^2 + 8x + 5 \\
&4x^5 + 18x^4 + 12x^3 - 29x^2 - 21x + 20 \\
&3x^5 - 12x^4 - 5x^3 + 43x^2 - 40x + 15 \\
&3x^5 - 6x^4 - 7x^3 - 2x^2 - 13x - 20 \\
&8x^5 - 4x^4 - 18x^3 + 13x^2 - 20x + 25 \\
&12x^5 + 13x^4 - 24x^3 - x^2 - 8x + 10 \\
&6x^5 + 16x^4 + 7x^3 - 14x^2 - 18x - 4 \\
&20x^5 - 32x^4 + 47x^3 - 33x^2 + 19x - 3 \\
&5x^5 - 21x^4 - 18x^3 + 5x^2 + 12x + 6 \\
&15x^5 - 5x^4 + 16x^3 + 8x^2 - 15x - 3 \\
&25x^5 + 45x^4 + 30x^3 + 21x^2 + 5x + 6 \\
&9x^5 - 7x^3 - 18x^2 - 8x - 6 \\
&5x^5 + 24x^4 + 8x^3 + 20x^2 + 12x + 8 \\
&8x^5 + 6x^4 + 4x^3 - 37x^2 + 35x - 10 \\
&4x^5 + 4x^4 - 4x^3 - 2x^2 - 3x - 2 \\
&15x^5 - 20x^4 + 24x^3 + 3x^2 + 9x + 9 \\
&20x^5 - 7x^4 + 11x^3 + 2x - 20 \\
&15x^5 - 16x^4 - 17x^3 + 25x^2 - 6 \\
&20x^5 + 12x^4 + 27x^3 + 24x^2 + 18x + 9 \\
&9x^5 - 21x^4 + 13x^3 + 16x^2 - 26x + 12 \\
&3x^5 + 3x^4 + 19x^3 + 3x^2 + 8x - 16 \\
&12x^5 - 26x^4 + 15x^3 + 27x^2 - 45x + 20 \\
&25x^5 - 50x^4 + 5x^3 + 25x^2 - 10x + 1 \\
&20x^5 - 6x^4 - 15x^3 - 5x^2 + 6x + 2 \\
&20x^5 + 13x^4 + 14x^3 - 15x^2 + 8x - 1 \\
&3x^5 - 9x^4 + 5x^3 - 7x^2 + 5x - 1 \\
&6x^5 - 5x^4 - 11x^3 - 2x^2 - 21x - 15 \\
&8x^5 + 22x^4 + 15x^3 - 11x^2 - 17x - 6 \\
&25x^5 - 25x^4 + 4x^3 - 13x - 15 \\
&4x^5 - 7x^4 + 3x^3 - 13x^2 - 2x - 3 \\
&2x^5 + 9x^4 + 16x^3 + 18x^2 - 3x - 2 \\
&20x^5 - 35x^4 + 60x^3 - 56x^2 + 37x - 20
\end{aligned}$$

$$\begin{aligned}
&12x^5 + x^4 - 5x^3 + 2x^2 + x - 1 \\
&9x^5 + 3x^4 - 23x^3 - 11x^2 + 8x + 6 \\
&15x^5 - 6x^4 - 14x^3 - 7x^2 + 3x + 3 \\
&20x^5 - x^4 - 25x^3 + 49x^2 - 31x + 12 \\
&4x^5 - 21x^4 + 32x^3 - 30x^2 + 13x - 4 \\
&8x^5 - 16x^4 - 16x^3 + 5x^2 + 18x + 9 \\
&15x^5 + 20x^4 - 10x^3 - 9x^2 - 12x + 6 \\
&3x^5 + 14x^4 - 19x^3 - 3x^2 + 23x - 12 \\
&4x^5 + 25x^4 + 40x^3 + 3x^2 - 10x + 15 \\
&5x^5 + 7x^4 + 10x^3 + 8x^2 - 6x + 3 \\
&4x^5 - 3x^4 + 12x^3 - 7x^2 + 6 \\
&10x^5 + 15x^4 + 16x^3 - 4x^2 - 5x + 4 \\
&10x^5 - 17x^4 + 11x^3 - 3x^2 + 4x - 4 \\
&25x^5 + 25x^4 - 21x^3 - 6x^2 + 10x - 3 \\
&4x^5 - 4x^4 - 4x^3 - 8x^2 + 13x - 3 \\
&3x^5 - 13x^4 + 28x^3 - 26x^2 + 10x + 8 \\
&5x^5 - 19x^4 + x^2 - 3x + 6 \\
&5x^5 + 8x^4 - 19x^3 + 23x^2 - 10x - 20 \\
&4x^5 + x^4 - 19x^3 + 25x^2 - 3x - 20 \\
&10x^5 + 4x^4 + 2x^3 - 3x^2 - 5x - 1 \\
&16x^5 - 12x^4 - 16x^3 - 11x^2 + x + 10 \\
&25x^5 + 20x^4 + 30x^3 + 37x^2 + 32x + 12 \\
&3x^5 - 2x^4 - 3x^3 - 9x^2 + 4x + 1 \\
&12x^5 + 13x^4 - 26x^3 - 3x^2 + 20x - 25 \\
&12x^5 - 7x^4 - x^3 - 8x^2 + x - 3 \\
&2x^5 - 2x^4 + 7x^3 - 12x^2 + 15x - 25 \\
&8x^5 + 18x^4 + x^3 + 24x^2 - 10x + 1 \\
&20x^5 - 32x^4 + 25x^3 + 7x^2 - 21x - 6 \\
&16x^5 + 32x^4 + 16x^3 - 16x^2 - 17x + 4 \\
&4x^5 - 12x^4 + 7x^3 + 27x^2 - 15x - 15 \\
&16x^5 - 8x^4 - 24x^3 - 10x^2 + 15x + 5 \\
&15x^5 - 35x^3 + 13x^2 + 2x - 1 \\
&4x^5 - x^4 - 28x^3 + 24x^2 + 17x - 10 \\
&15x^5 - 20x^4 + 35x^3 - 17x^2 + 16x + 4 \\
&20x^5 + x^4 + 18x^3 - 19x^2 + 19x - 6 \\
&9x^5 - 15x^4 - 12x^3 - 5x^2 + 4x + 10 \\
&10x^5 + 8x^4 + 33x^3 - 5x^2 + 15x - 25 \\
&12x^5 - 15x^3 + 5x^2 - 8x - 2 \\
&20x^5 - 5x^4 - 7x^3 - 16x^2 + 24x - 8 \\
&3x^5 - 15x^4 + 23x^3 - 5x^2 - 6x + 8 \\
&8x^5 - 30x^4 + 17x^3 + 13x^2 - 16x + 4 \\
&25x^5 - 25x^4 - 31x^3 + 4x^2 + 24x + 9
\end{aligned}$$

$$\begin{aligned}
&6x^5 + 25x^4 + 3x^3 - 33x^2 + 40x - 20 \\
&5x^5 - 30x^4 + 19x^3 + 5x^2 + 26x + 5 \\
&16x^5 - 24x^4 - 4x^3 - 18x^2 + 10x + 25 \\
&2x^5 - 9x^4 + 3x^3 + 11x^2 + 16x + 10 \\
&2x^5 + 13x^4 + 9x^3 - 21x^2 - 21x + 10 \\
&9x^5 - x^3 + 22x^2 - 14x + 12 \\
&12x^5 - 26x^4 + 35x^3 - 26x^2 + 17x - 4 \\
&12x^5 + 17x^4 - 9x^3 + 15x^2 - 31x + 12 \\
&2x^5 + 2x^3 + 11x^2 + 10x - 4 \\
&6x^5 + 7x^4 + 17x^3 + 3x^2 - 20 \\
&8x^5 - 10x^4 + x^3 + 24x^2 - 8 \\
&8x^5 + 6x^4 - 9x^3 + 2x^2 - 24x - 5 \\
&20x^5 - 11x^4 - 3x^3 - 24x^2 - 21x - 5 \\
&5x^5 + 18x^4 - 25x^3 - 4x - 12 \\
&5x^5 + 28x^4 + 27x^3 + 21x^2 + 7x + 2 \\
&5x^5 - 20x^4 - 13x^3 + 5x^2 + 9x + 2 \\
&20x^5 + 21x^4 - 8x^3 - 22x^2 - 10x + 8 \\
&12x^5 + 17x^4 + 30x^3 + 24x^2 + 24x + 5 \\
&3x^5 + x^4 + 3x^3 - 16x^2 - 8x + 8 \\
&3x^5 + 14x^4 + 15x^3 + 24x^2 + 45x + 20 \\
&10x^5 + 2x^4 - 37x^3 + 31x^2 - 2x - 6 \\
&15x^5 - 20x^4 + 28x^3 - 15x^2 + 2x + 8 \\
&4x^5 - 10x^4 + 8x^3 - 25x^2 - 11x - 20 \\
&10x^5 + 2x^4 + x^3 - 11x^2 - 5x - 6 \\
&16x^5 + 12x^4 + 24x^3 + 14x^2 + 11x - 5 \\
&4x^5 - 18x^4 - 13x^3 - 30x^2 - 5x + 2 \\
&20x^5 + 15x^4 - 32x^3 + 8x^2 + 29x - 12 \\
&15x^5 - 7x^4 + 28x^3 - 2x^2 + 16x + 5 \\
&3x^5 - 6x^4 + 14x^3 - 7x^2 + 9x + 9 \\
&6x^5 + x^3 - 14x^2 + 1 \\
&9x^5 - 3x^4 + 25x^2 - 21x + 10 \\
&8x^5 - 10x^4 - 20x^3 + 35x^2 - 13x - 20 \\
&8x^5 + 6x^4 + 22x^3 + 35x^2 + 20x + 5 \\
&25x^5 + 30x^4 - x^3 - 26x^2 - 27x + 20 \\
&16x^5 - 12x^4 - 24x^3 - 13x^2 + 17x + 20 \\
&4x^5 + 11x^4 - 2x^3 - x^2 + 10x - 10 \\
&12x^5 - 15x^4 + 23x^3 - 10x^2 + 7x + 4 \\
&25x^5 + 10x^4 - 3x^3 + 22x^2 - 11x + 6 \\
&20x^5 - 2x^4 - 33x^3 - 16x^2 + 9x + 10 \\
&20x^5 + 29x^4 + x^3 + 6x^2 - 18x - 8 \\
&16x^5 - 4x^4 - 24x^3 - 47x^2 + 8x + 16 \\
&16x^5 + 8x^4 + 25x^3 - 6x^2 + 6x - 9
\end{aligned}$$



# 3. 육차식의 인수분해

## 3.1 일계수 육차식 1형

$$\begin{aligned} & x^6 - 5x^5 + 5x^4 - 15x^3 - 33x^2 - 31x - 12 \\ & x^6 + 3x^5 - 16x^4 - 7x^3 + 26x^2 - 6x - 3 \\ & x^6 - 7x^5 + 15x^4 - 9x^3 + 3x^2 - 9x - 9 \\ & x^6 + 4x^5 - 4x^4 + 24x^3 - 31x^2 + 25x - 12 \\ & x^6 + 2x^5 - 7x^4 - 7x^3 + 2x^2 + 8x - 20 \\ & x^6 - x^5 - 4x^4 + 8x^3 - x^2 - 10x - 3 \\ & x^6 - 2x^5 - 3x^4 + 7x^2 + 14x - 5 \\ & x^6 + 5x^5 + 2x^4 - 13x^3 + x^2 + 10x - 8 \\ & x^6 - 9x^4 - 2x^3 + 12x^2 - 3 \\ & x^6 - 10x^5 + 18x^4 + 39x^3 - 8x^2 - 13x + 3 \\ & x^6 - 5x^5 + 2x^4 + 20x^3 - 15x^2 - 23x - 4 \\ & x^6 - 20x^4 - 12x^3 + 8x^2 - 4x + 3 \\ & x^6 + 2x^5 - 8x^4 - 11x^3 + 24x^2 + 15x - 25 \\ & x^6 + x^5 + x^4 - 6x^3 - x^2 - 13x - 3 \\ & x^6 - 6x^4 - 2x^3 + 5x^2 - 2x - 3 \\ & x^6 - x^5 - 5x^4 - 31x^3 - 16x^2 - 4x + 16 \\ & x^6 + 2x^5 + 3x^4 - 2x^3 - 6x^2 - 5x - 1 \\ & x^6 + 4x^5 - 2x^4 + 2x^3 + 19x^2 + 12x + 4 \\ & x^6 - 8x^5 + 11x^4 + 21x^3 - 11x^2 + 12x - 12 \\ & x^6 - 3x^5 + 8x^3 - 10x^2 - 15x + 10 \\ & x^6 - 5x^5 + 4x^4 + 6x^3 - 18x^2 + 8 \\ & x^6 + 4x^5 - 12x^3 - 29x^2 - 30x - 25 \\ & x^6 + 10x^5 + 24x^4 - 9x^3 - 20x^2 + 5x - 5 \\ & x^6 + 2x^5 - 4x^4 + 5x^2 - 4x + 1 \\ & x^6 + 2x^5 - 14x^4 + 10x^3 - 25x^2 + 6x - 4 \\ & x^6 + x^5 - 12x^4 + 13x^2 - 9x + 2 \\ & x^6 + 6x^5 + 15x^4 + 21x^3 - 4x^2 - 3x - 4 \\ & x^6 - 3x^5 + 2x^4 + 4x^3 - 11x^2 + 8x + 5 \\ & x^6 + 3x^5 + 9x^3 - 22x^2 + 4x + 2 \\ & x^6 + x^5 - 11x^4 - 18x^3 - 2x^2 + 10x + 8 \\ & x^6 - 3x^5 - 5x^4 + 3x^3 - 10x + 10 \\ & x^6 + 7x^5 + 8x^4 - 10x^3 - 6x^2 + 25x - 20 \\ & x^6 - x^5 - 4x^4 - 17x^3 + 11x^2 - 26x + 8 \\ & x^6 + 2x^5 - 12x^4 - 22x^3 - 11x^2 - 6x - 1 \end{aligned}$$

$$\begin{aligned} & x^6 - 2x^5 - 6x^4 - 17x^3 + 15x^2 + 7x - 4 \\ & x^6 + 4x^5 + x^4 + 26x^3 - 9x^2 + 18x - 8 \\ & x^6 - 4x^5 + 8x^4 - 16x^2 + 16x + 16 \\ & x^6 - x^5 - 6x^3 + 2x^2 + x + 12 \\ & x^6 - 7x^5 + 20x^4 - 25x^3 + 2x^2 + 12x - 10 \\ & x^6 + 3x^5 - 13x^4 - 21x^3 - 5x^2 - 19x + 15 \\ & x^6 - 3x^5 + 3x^4 - 23x^3 + 2x^2 - 12x + 16 \\ & x^6 + x^5 - 21x^4 - 42x^3 - 43x^2 - 22x - 6 \\ & x^6 - 4x^5 - 3x^4 + 11x^3 + 16x^2 + 21x - 10 \\ & x^6 - 10x^5 + 24x^4 + 15x^3 - 56x^2 - 5x + 25 \\ & x^6 + x^5 - 8x^4 + 5x^3 - 17x^2 + 6x - 12 \\ & x^6 + 2x^5 - 21x^4 + 6x^3 + 4x^2 - 10x + 3 \\ & x^6 + 8x^5 + 13x^4 - 17x^3 - 22x^2 - 11x - 2 \\ & x^6 - x^5 + 9x^4 - 2x^3 + 22x^2 + 6x - 8 \\ & x^6 + 2x^5 - 6x^4 + 10x^3 - 29x^2 + 33x - 20 \\ & x^6 + 8x^5 + 20x^4 + 24x^3 + 27x^2 + 10x + 15 \\ & x^6 + x^5 - 6x^4 - 7x^2 + 11x + 12 \\ & x^6 + 2x^5 - 22x^4 - x^3 + 12x^2 + 18x + 8 \\ & x^6 - 7x^5 + 11x^4 - 3x^3 + 8x^2 - 2x - 2 \\ & x^6 - 3x^5 - 10x^4 - 37x^3 - x^2 + 30x - 8 \\ & x^6 + 3x^5 - 11x^4 + 17x^3 - 29x^2 + 17x - 12 \\ & x^6 + 8x^5 + 23x^4 + 35x^3 + 16x^2 + 7x - 2 \\ & x^6 + x^5 - 14x^4 + 14x^3 + 3x^2 - 6x + 5 \\ & x^6 - 3x^5 - 13x^4 + 15x^3 - 21x^2 + 9x - 9 \\ & x^6 + x^5 - 9x^4 + 6x^3 - 3x^2 - 6x + 4 \\ & x^6 + x^5 - 3x^3 - x^2 + 14x + 4 \\ & x^6 + 6x^5 + x^4 - 5x^3 + 27x^2 - 14x + 12 \\ & x^6 - 4x^5 - 3x^4 + 4x^3 - 4x^2 + 2x + 1 \\ & x^6 - 3x^5 - 3x^4 + 16x^3 + 13x^2 - 35x - 25 \\ & x^6 - 11x^4 - 5x^3 - 8x^2 + 5x + 4 \\ & x^6 + 2x^5 - 3x^4 - 3x^3 + 10x^2 - 3x - 20 \\ & x^6 - x^5 - 7x^4 + 13x^3 - 12x^2 + 6x + 6 \\ & x^6 - 29x^4 + 6x^3 + 3x^2 + 8x + 4 \\ & x^6 - 2x^5 - 11x^4 - 24x^2 + 8x - 5 \end{aligned}$$

$$\begin{aligned}
& x^6 + 7x^5 + 7x^4 - 2x^3 - 8x^2 - 18x - 8 \\
& x^6 - 15x^4 + 8x^3 + 23x^2 - 5 \\
& x^6 - 28x^4 + 27x^3 - 44x^2 + 17x - 15 \\
& x^6 + 3x^5 - 8x^4 + 32x^3 - 24x^2 + 13x - 2 \\
& x^6 + 2x^5 - 16x^4 + 3x^3 - 18x^2 + 7x + 15 \\
& x^6 + x^5 - 4x^4 - 15x^3 - 28x^2 - 30x - 15 \\
& x^6 - 4x^5 - 6x^4 + 26x^3 - 35x^2 + 33x - 10 \\
& x^6 + 3x^5 + 5x^3 - 10x^2 + 4x + 3 \\
& x^6 + 7x^5 + 10x^4 + 16x^3 - 14x^2 - 25x - 6 \\
& x^6 + 5x^5 + 7x^4 + 12x^3 - 7x^2 - 2x + 6 \\
& x^6 - 20x^4 + 14x^3 - 5x^2 - 10x + 8 \\
& x^6 - 4x^5 + 11x^4 - 24x^3 + 25x^2 - 26x + 8 \\
& x^6 - 8x^5 + 18x^4 - 12x^3 - 13x^2 + 3x + 2 \\
& x^6 + x^5 - 9x^4 + 3x^3 + 20x^2 - 16x - 8 \\
& x^6 - 2x^5 + x^4 - 9x^2 - 12x - 4 \\
& x^6 + x^5 - 12x^4 - 36x^3 - 15x^2 + 15x - 2 \\
& x^6 - 6x^5 + 4x^4 + 3x^3 + 6x^2 + 2x - 8 \\
& x^6 + 7x^5 + 13x^4 + 15x^3 - 37x^2 + 5x + 5 \\
& x^6 - 5x^5 + 4x^4 + 7x^3 - 17x^2 + 14x - 12 \\
& x^6 + x^5 - x^4 - 16x^3 - 14x^2 + 21x - 4 \\
& x^6 - 20x^4 - 9x^3 + 24x^2 + 21x + 5 \\
& x^6 + 2x^5 - 13x^4 - 18x^3 + 4x^2 + 10x + 3 \\
& x^6 + 2x^5 - 13x^4 - 14x^3 + 6x^2 - 15x + 9 \\
& x^6 - 5x^5 + x^4 + 8x^3 + 14x^2 + 15x - 4 \\
& x^6 + 6x^5 + 7x^4 + 3x^3 - 18x^2 + 11x - 2 \\
& x^6 - 5x^5 + 6x^4 - 3x^3 + 10x^2 - 2x + 3
\end{aligned}$$

$$\begin{aligned}
& x^6 - x^5 - 18x^4 + 26x^3 - 17x^2 + 6x - 1 \\
& x^6 + 2x^5 + 5x^4 + 5x^3 + x^2 + 8x - 2 \\
& x^6 - 2x^5 - 4x^4 + 2x^3 - 15x^2 + 6x - 9 \\
& x^6 - 2x^5 - 16x^4 - 21x^3 - 34x^2 - 17x + 5 \\
& x^6 + 5x^5 + 11x^4 + 15x^3 + 5x^2 - 25x - 25 \\
& x^6 - 14x^4 - 16x^3 - 35x^2 - 16x - 16 \\
& x^6 + 3x^5 + 3x^4 - 5x^3 - 13x^2 - 13x + 15 \\
& x^6 + 9x^5 + 24x^4 + 22x^3 + 14x^2 + 11x - 4 \\
& x^6 - 5x^5 - 4x^4 + 14x^3 + 36x^2 + 37x + 20 \\
& x^6 - 3x^5 + 2x^4 - 15x^3 - 30x^2 - 40x - 25 \\
& x^6 + 9x^5 + 28x^4 + 27x^3 - 24x^2 - 36x + 20 \\
& x^6 + 2x^5 - 5x^4 + 10x^3 - 15x^2 - 25 \\
& x^6 - 4x^5 - 4x^4 + 7x^3 + 16x^2 + 2x - 6 \\
& x^6 + 3x^5 + 2x^4 + 6x^3 - 4x^2 - 3x + 2 \\
& x^6 + 3x^5 + x^4 - 2x^3 - 8x^2 + 10x - 8 \\
& x^6 + 6x^5 + 13x^4 + 10x^3 - 2x^2 - 4x + 1 \\
& x^6 + 4x^5 - x^4 - 19x^3 - 20x^2 - 15x + 20 \\
& x^6 + x^5 - 17x^4 + x^3 - 15x^2 + 3x - 9 \\
& x^6 + 5x^5 + 16x^4 + 24x^3 + 20x^2 - 5x - 6 \\
& x^6 + 6x^5 + 11x^4 - 2x^3 - 27x^2 - 8x + 16 \\
& x^6 + 2x^5 + 2x^4 + 23x^3 + 8x^2 + 20x + 16 \\
& x^6 + 2x^5 - 7x^4 + 12x^3 + 28x^2 + 16x + 3 \\
& x^6 + 7x^5 + 18x^4 + 36x^3 + 31x^2 + 21x + 6 \\
& x^6 + 3x^5 - 6x^4 + 24x^3 - 6x^2 - 9x + 2 \\
& x^6 - 2x^5 - 11x^4 + 8x^3 + 28x^2 - 20x - 5 \\
& x^6 + 3x^5 - 11x^4 - 8x^3 + 22x^2 - 17x + 6
\end{aligned}$$

### 3.2 일계수 육차식 2형

$$\begin{aligned}
& x^6 - 8x^5 + 21x^4 - 51x^3 + 68x^2 - 55x - 60 \\
& x^6 + 5x^5 - 35x^4 - 175x^3 + 29x^2 + 105x - 20 \\
& x^6 + 11x^5 + 47x^4 + 99x^3 + 95x^2 - 5x - 50 \\
& x^6 + x^5 - 29x^4 - 37x^3 + 113x^2 - 29x - 10 \\
& x^6 - 2x^5 - 15x^4 + 33x^3 - 56x^2 + 37x - 6 \\
& x^6 + 4x^5 - 6x^4 + 20x^3 - 50x^2 + 25 \\
& x^6 + x^5 - 32x^4 - 63x^3 + 80x^2 + 65x - 25 \\
& x^6 - 2x^5 - 13x^4 - 11x^3 + 46x^2 + 87x + 36 \\
& x^6 - 3x^5 - 12x^4 + 53x^3 - 80x^2 + 65x - 25 \\
& x^6 + 6x^5 + 9x^4 - 11x^3 - 36x^2 - 9x + 20 \\
& x^6 + 6x^5 - 4x^4 - 53x^3 - 16x^2 + 30x + 12 \\
& x^6 - 4x^5 - 12x^4 + 52x^3 - 6x^2 - 70x + 25 \\
& x^6 - 2x^5 - 31x^4 + 88x^3 - 7x^2 - 50x + 10 \\
& x^6 - x^5 + 4x^4 - 5x^3 + 4x^2 - 9x - 9 \\
& x^6 - 3x^5 - 14x^4 + 3x^3 + 15x^2 + 26x + 8 \\
& x^6 - 18x^4 - 4x^3 + 54x^2 + 48x + 9 \\
& x^6 - 3x^5 - 3x^4 + 7x^3 + 4x^2 - 26x - 40 \\
& x^6 + 3x^5 - 27x^4 - 125x^3 - 125x^2 + 25x + 50
\end{aligned}$$

$$\begin{aligned}
& x^6 + 3x^5 + 2x^4 + 7x^3 - 6x^2 + 11x - 3 \\
& x^6 + x^5 - 12x^4 + 5x^3 + 44x^2 - 63x + 15 \\
& x^6 - 2x^5 - 11x^4 - 14x^3 + 43x^2 + 88x + 30 \\
& x^6 - 17x^4 + 24x^3 - 35x^2 - 66x - 12 \\
& x^6 + 6x^5 + 6x^4 - 19x^3 - 26x^2 + 14x + 8 \\
& x^6 - 5x^5 - 5x^4 + 18x^3 - 37x^2 - 9x + 9 \\
& x^6 - 2x^5 - 17x^4 + 44x^3 + 5x^2 - 80x + 50 \\
& x^6 + x^5 - 3x^4 - 7x^3 - 19x^2 + 9x + 36 \\
& x^6 + 6x^5 + 13x^4 + 24x^3 + 41x^2 + 50x + 30 \\
& x^6 - 3x^5 - 10x^4 + 28x^3 - 41x^2 + 31x + 10 \\
& x^6 - x^5 - 20x^4 - 29x^3 - 57x^2 + 2x + 24 \\
& x^6 + 12x^5 + 42x^4 + 44x^3 + 21x^2 - 168x + 80 \\
& x^6 + 4x^5 - 21x^4 - 88x^3 - 18x^2 + 56x + 24 \\
& x^6 + 4x^5 - 9x^4 - 45x^3 - 76x^2 + 23x + 30 \\
& x^6 + 4x^5 - 14x^4 - 29x^3 + 40x^2 + 22x - 12 \\
& x^6 - 4x^5 - 10x^4 + 14x^3 + 21x^2 - 102x - 40 \\
& x^6 + 11x^5 + 34x^4 + 31x^3 + 47x^2 - 56x + 12 \\
& x^6 - 2x^3 - 2x^2 - 2x - 1
\end{aligned}$$

$$\begin{aligned}
& x^6 + 3x^5 - 11x^4 + 12x^3 + 25x^2 - 135x + 25 \\
& x^6 + 5x^5 - 19x^4 - 38x^3 + 215x^2 - 235x + 75 \\
& x^6 - 7x^5 + 17x^4 - 32x^3 + 27x^2 - 33x - 45 \\
& x^6 - 6x^5 + 10x^4 - 12x^3 + 19x^2 + 18x - 6 \\
& x^6 + x^5 - 11x^4 - 11x^3 + 29x^2 + 21x - 20 \\
& x^6 + 3x^5 + 6x^4 + 35x^3 + 30x^2 + 75x + 125 \\
& x^6 - 6x^5 + 7x^4 - 18x^3 + 23x^2 - 26x - 6 \\
& x^6 - 5x^5 + 5x^4 + 2x^3 - 21x^2 + 39x - 9 \\
& \quad x^6 + 10x^4 + 31x^2 + 30 \\
& x^6 - 7x^5 + 9x^4 + 9x^3 - 8x^2 + 32x + 24 \\
& x^6 - x^5 - 11x^4 - 5x^3 + 33x^2 + 35x - 60 \\
& x^6 + 5x^5 - 23x^4 - 135x^3 - 101x^2 - 25x - 2 \\
& x^6 + 7x^5 + 17x^4 + 26x^3 + 47x^2 + 67x + 15 \\
& x^6 - 2x^5 - 24x^4 + 58x^3 + 60x^2 - 110x - 25 \\
& x^6 - 2x^5 - 14x^4 - 17x^3 + 2x^2 + 84x + 16 \\
& x^6 + 2x^5 + 8x^4 + 9x^3 + 26x^2 + 4x + 40 \\
& x^6 + 6x^5 - 5x^4 - 16x^3 + 105x^2 - 20x - 50 \\
& x^6 + 10x^5 + 29x^4 + 20x^3 - 9x^2 - 54x + 27 \\
& x^6 + 3x^5 - 5x^4 - 39x^3 - 62x^2 - 18x + 40 \\
& x^6 + 2x^5 - 11x^4 + 7x^3 + 42x^2 - 61x + 12 \\
& x^6 + 5x^5 - 5x^4 - 15x^3 - 50x^2 + 20x + 16 \\
& x^6 - 21x^4 - 11x^3 + 100x^2 + 145x + 50 \\
& x^6 - x^5 - 12x^4 + 11x^3 - 19x^2 - 12x + 12 \\
& x^6 - 4x^5 - 8x^4 + 4x^3 + 88x^2 + 84x + 15 \\
& x^6 + 2x^5 - 5x^4 + 25x^3 - 32x^2 + 39x - 18 \\
& x^6 - 3x^5 - 2x^4 - 24x^3 - 32x^2 - 48x - 32 \\
& \quad x^6 + 6x^5 + 10x^4 + 24x^3 + 16x^2 - 32 \\
& \quad x^6 - x^5 - x^4 + 12x^3 - 17x^2 - 7x + 5 \\
& x^6 + 7x^5 + 12x^4 + 15x^3 + 15x^2 + 38x - 8 \\
& \quad x^6 - 2x^5 - 5x^4 + 14x^3 - 13x^2 - 2x + 2 \\
& x^6 + 7x^5 + 11x^4 + 12x^3 + 25x^2 - 115x - 25 \\
& \quad x^6 - 6x^5 + 11x^4 - 3x^3 - 32x^2 + 57x + 20 \\
& x^6 + 3x^5 - 27x^4 - 101x^3 - 5x^2 + 145x + 50 \\
& \quad x^6 - 11x^5 + 34x^4 - 4x^3 - 68x^2 - 44x - 8 \\
& \quad x^6 + 2x^4 - 22x^3 - 50x^2 - 100x - 125 \\
& \quad x^6 + 3x^5 + 32x^3 - 32x^2 + 80x - 64 \\
& \quad x^6 + 2x^5 + 4x^4 + x^3 - 8x^2 - 10x - 8 \\
& \quad x^6 + 2x^5 - 8x^4 + 16x^3 - 9x^2 + 38x - 24 \\
& \quad x^6 + 9x^5 + 27x^4 + 38x^3 + 23x^2 - 11x - 3 \\
& \quad x^6 - 6x^5 + 3x^4 - 6x^3 + 61x^2 + 132x + 60 \\
& \quad x^6 - 2x^5 - 15x^4 - 33x^3 - 64x^2 - 15x + 20 \\
& \quad x^6 - 7x^5 - 6x^4 + 69x^3 + 45x^2 - 14x - 8
\end{aligned}$$

$$\begin{aligned}
& x^6 - 8x^5 + 24x^4 - 24x^3 - 27x^2 + 80x - 50 \\
& x^6 - 2x^5 - 24x^4 + 74x^3 - 124x^2 + 66x - 9 \\
& x^6 - 3x^5 - 11x^4 + 30x^3 - 14x^2 - 36x + 40 \\
& \quad x^6 + x^5 - 23x^4 + 9x^3 + 35x^2 + 3x - 6 \\
& \quad x^6 + 4x^5 + 3x^4 - 8x^3 - 26x^2 - 12x + 24 \\
& \quad x^6 + x^5 - 29x^4 - 39x^3 + 103x^2 + 73x + 10 \\
& \quad x^6 + x^5 - 19x^4 + 8x^3 + 50x^2 - 8x - 24 \\
& \quad x^6 - 6x^5 - 18x^4 + 112x^3 + 14x^2 - 22x + 3 \\
& \quad x^6 + 13x^5 + 50x^4 + 29x^3 - 102x^2 + 21x + 9 \\
& \quad x^6 + 2x^5 - 17x^4 + 12x^3 - 95x^2 + 140x - 50 \\
& \quad x^6 - 2x^5 - 5x^4 - 19x^3 - 8x^2 - 9x + 18 \\
& \quad x^6 - 5x^5 - 3x^4 + 37x^3 - 25x^2 - 27x + 12 \\
& \quad x^6 + 4x^5 + 9x^4 + 10x^3 - 12x^2 - 32x - 64 \\
& \quad \quad x^6 + 8x^4 + 37x^2 + 50 \\
& \quad x^6 - 7x^5 + 13x^4 - 9x^3 - 7x^2 + 45x - 18 \\
& \quad x^6 - 3x^5 - 9x^4 + 7x^3 + 58x^2 + 34x - 40 \\
& \quad \quad x^6 - 11x^4 - 6x^3 - 6x^2 + 76x - 40 \\
& \quad x^6 + 12x^5 + 48x^4 + 68x^3 - 5x^2 - 64x + 20 \\
& \quad x^6 + 3x^5 - 30x^4 - 101x^3 + 18x^2 + 51x + 9 \\
& \quad \quad x^6 + 2x^5 - 2x + 1 \\
& \quad \quad x^6 - 9x^5 + 20x^4 + 7x^3 - 35x^2 + 28x + 30 \\
& \quad x^6 + 14x^5 + 61x^4 + 63x^3 - 92x^2 - 25x + 10 \\
& \quad \quad x^6 + x^5 + 2x^4 + 9x^3 - 6x^2 - 7x - 15 \\
& \quad \quad x^6 - x^5 - 23x^4 + x^3 - 20x^2 + 2x + 4 \\
& \quad \quad x^6 + 6x^5 + 8x^4 + 19x^3 + 52x^2 - 26x - 20 \\
& \quad x^6 + 2x^5 - 20x^4 + 12x^3 + 91x^2 - 142x + 40 \\
& \quad \quad x^6 - 10x^5 + 35x^4 - 64x^3 + 63x^2 - 6x - 4 \\
& \quad x^6 + 7x^5 - 6x^4 - 117x^3 - 210x^2 - 85x + 25 \\
& \quad \quad x^6 + 2x^5 - 21x^4 - 18x^3 + 96x^2 + 40x - 80 \\
& \quad \quad x^6 - x^5 - 12x^4 - 13x^3 - 9x^2 + 2x + 2 \\
& \quad \quad \quad x^6 - 10x^5 + 22x^4 + 30x^3 - 76x^2 + 3 \\
& \quad \quad \quad x^6 + 2x^5 - 16x^4 - 8x^3 + 45x^2 + 6x - 18 \\
& \quad \quad \quad x^6 - 7x^5 + 16x^4 - 24x^3 + 19x^2 + 23x + 4 \\
& \quad \quad \quad x^6 - 4x^5 - 13x^4 + 38x^3 - 30x^2 - 60x - 16 \\
& \quad x^6 - 11x^5 + 26x^4 + 45x^3 - 99x^2 - 106x - 24 \\
& \quad \quad x^6 + x^5 - 10x^4 - 55x^3 - 125x^2 - 144x - 60 \\
& \quad \quad \quad x^6 - x^5 - 10x^4 - 13x^3 - 26x^2 + 15x + 9 \\
& \quad \quad \quad x^6 + 5x^5 - 9x^4 - 34x^3 + 75x^2 + 41x + 5 \\
& \quad \quad \quad \quad x^6 - x^5 - 6x^4 - 14x^3 + 32x + 16 \\
& \quad \quad \quad \quad x^6 - x^5 - 11x^4 - 8x^3 - 13x^2 - 7x - 1 \\
& \quad \quad \quad \quad x^6 - 7x^5 + 12x^4 + 9x^3 - 36x^2 + 9x + 27 \\
& \quad \quad \quad \quad x^6 + 9x^5 + 12x^4 - 43x^3 - 21x^2 + 18x + 8
\end{aligned}$$

### 3.3 일계수가 아닌 육차식 1형

$$\begin{aligned}
& 5x^6 - x^5 - 22x^4 - 11x^3 - 6x^2 - 6x + 2 \\
& 12x^6 - 23x^5 + 22x^4 - 26x^3 + 19x^2 + 9x - 15
\end{aligned}$$

$$\begin{aligned}
& 12x^6 - 9x^5 - 23x^4 + 17x^3 + 6x^2 - 6x + 1 \\
& 3x^6 + 16x^5 + 20x^4 - 3x^3 + 16x^2 + 20x - 16
\end{aligned}$$

$$\begin{aligned}
&20x^6 + 12x^4 - 7x^3 + 3x^2 - x - 1 \\
&25x^6 - 16x^4 - 43x^3 + 12x + 16 \\
&25x^6 - 5x^5 + 10x^4 + 38x^3 - 18x^2 + 3x + 12 \\
&3x^6 - 9x^5 - 5x^4 - 8x^3 - 33x^2 + 5x - 25 \\
&20x^6 + 33x^5 + 10x^4 - 38x^3 - 42x^2 - 11x + 4 \\
&25x^6 + 25x^5 - 21x^4 + 15x^3 + 13x^2 - 25x + 10 \\
&8x^6 - 2x^5 + 21x^4 + 10x^2 - 19x - 4 \\
&3x^6 - 17x^5 + 2x^4 - 4x^3 - 17x^2 + 16x - 3 \\
&9x^6 - 6x^5 + 9x^4 + 24x^3 + 7x^2 + 32x + 16 \\
&6x^6 + 4x^5 - 13x^4 - 6x^3 - 10x^2 + 5x + 12 \\
&12x^6 - 17x^5 + 13x^4 + 25x^3 - 34x^2 + 8x + 20 \\
&16x^6 - 8x^5 - 20x^4 + 12x^3 + 12x^2 - x - 15 \\
&9x^6 - 6x^5 + 12x^4 - 10x^3 + 12x^2 - 4x - 8 \\
&12x^6 + 9x^5 + 15x^4 + 35x^3 + 15x^2 + 25x + 25 \\
&20x^6 + 5x^5 + 22x^4 + 32x^3 + 38x^2 + 7x - 4 \\
&8x^6 + 6x^5 - 25x^4 - 35x^3 - 4x^2 + 28x + 16 \\
&4x^6 + 2x^5 + 25x^4 + 23x^3 + 33x^2 + 5x - 12 \\
&9x^6 - 30x^5 + 16x^4 + 27x^3 - 20x^2 - 15x - 5 \\
&25x^6 - 5x^5 - 40x^4 + 4x^3 + 19x^2 - 9 \\
&20x^6 - 3x^5 - 11x^4 + 37x^3 - 9x^2 + 6 \\
&20x^6 + 28x^5 + 17x^4 - 15x^3 - 14x^2 + 40x - 20 \\
&12x^6 + 11x^5 + 8x^4 + 21x^3 + 3x^2 + 8x + 5 \\
&9x^6 - 13x^4 - 3x^3 + 2x^2 + 19x - 12 \\
&15x^6 - 34x^5 - 22x^4 + 14x^3 + 39x^2 + 22x + 6 \\
&4x^6 + 12x^5 + 14x^4 - 8x^3 - 26x^2 - 13x + 20 \\
&20x^6 + 29x^5 + 7x^4 - 41x^3 - 19x^2 + 6x + 10 \\
&12x^6 + 15x^5 - 6x^4 + 8x^3 - 5x^2 + 2x - 4 \\
&6x^6 + 13x^5 - 10x^4 - 20x^3 - 6x^2 - 3x - 20 \\
&2x^6 - x^5 - 8x^4 - 11x^3 + 12x^2 + 15x + 12 \\
&10x^6 - 14x^5 + 2x^4 - x^3 - 14x^2 - 12x - 4 \\
&3x^6 + 4x^4 + 3x^3 - 36x^2 + 29x - 5 \\
&12x^6 - 17x^5 + 24x^4 - 5x^3 - x^2 + 12x - 3 \\
&10x^6 + 25x^5 + 4x^4 - 27x^3 - 11x^2 + 4x + 2 \\
&8x^6 - 22x^4 + 12x^3 + 14x^2 - 15x - 9 \\
&4x^6 - 3x^5 + 16x^4 - 18x^3 - 17x^2 + 9x - 1 \\
&20x^6 + 22x^5 - 11x^4 + 8x^3 + 14x^2 - 13x - 10 \\
&4x^6 - 3x^5 + 19x^4 + 13x^3 + 7x^2 - 20x - 12 \\
&16x^6 + 4x^5 - 18x^4 + 34x^3 + x^2 - 9x + 12 \\
&4x^6 + 6x^5 - 8x^4 - 19x^3 + 12x^2 + 22x - 8 \\
&20x^6 + 17x^5 + 35x^4 + 12x^3 + 46x^2 - 9 \\
&8x^6 - 10x^5 - 2x^4 - 3x^3 - 20x^2 + 2x - 5 \\
&20x^6 - 13x^5 - 12x^4 - 30x^3 + 13x^2 + 13x + 15 \\
&9x^6 + 3x^5 + 3x^4 + 17x^3 - 21x^2 + 29x - 5 \\
&12x^6 + 24x^5 + 8x^4 - 39x^3 - 51x^2 + 25 \\
&2x^6 - 7x^5 + 10x^4 - 24x^3 + 19x^2 - 2x + 8 \\
&20x^6 + 8x^5 - 13x^4 - 6x^3 + 26x^2 - 8x - 15 \\
&16x^6 - 49x^4 + 44x^3 + 5x^2 - 18x + 9
\end{aligned}$$

$$\begin{aligned}
&25x^6 + 6x^4 + 20x^3 + 23x^2 - 21x - 20 \\
&16x^6 - 4x^5 - 20x^4 + 35x^3 + 8x^2 - 12x - 3 \\
&2x^6 - 5x^5 - 6x^4 + 17x^3 + 5x^2 - 30x - 10 \\
&10x^6 - 10x^5 + 12x^4 - 9x^3 - 6x^2 + 5x - 12 \\
&9x^6 - 12x^5 - 20x^4 + 16x^3 + 9x^2 + 5x + 2 \\
&3x^6 + 9x^5 - x^4 + 8x^3 - 3x^2 - 4x - 4 \\
&9x^6 - 24x^5 + 15x^4 + 10x^3 - 42x^2 - 8x + 8 \\
&25x^6 - 6x^4 - 17x^3 - 2x^2 + 2x + 4 \\
&3x^6 - 11x^5 + 6x^4 + 32x^3 - 23x^2 + 10x + 25 \\
&10x^6 + 4x^5 - 20x^4 + 37x^3 - 33x^2 + 27x - 15 \\
&4x^6 + 2x^5 - 4x^4 - 6x^3 + 5x^2 + 17x - 12 \\
&16x^6 + 8x^5 - 3x^4 - 16x^3 + 8x^2 - 5 \\
&4x^6 - 13x^5 + 7x^4 - 7x^3 + 10x^2 + 2x + 15 \\
&10x^6 - 20x^5 - 6x^4 - 27x^3 - 16x^2 - 16x - 15 \\
&6x^6 + 22x^5 + 27x^4 + 10x^3 - x^2 - 3x - 9 \\
&12x^6 - 18x^5 - 6x^4 + 11x^3 + 5x^2 + 15x - 25 \\
&6x^6 - 3x^5 + 6x^4 + 8x^3 - 16x^2 + 19x - 4 \\
&5x^6 + 10x^5 + 18x^4 + 25x^3 + 6x + 20 \\
&6x^6 + 5x^5 + 12x^4 + 4x^3 + 2x^2 - 7x - 6 \\
&12x^6 + 16x^5 + 2x^4 + 13x^3 - x^2 + 7x - 5 \\
&3x^6 + 5x^5 - 11x^4 - 24x^3 - 5x^2 + 25x + 15 \\
&2x^6 - 2x^5 - 3x^4 + 15x^3 - 2x^2 - 15x + 10 \\
&9x^6 - 3x^5 - 9x^3 - 11x^2 - 4x - 4 \\
&4x^6 + 13x^5 + 13x^4 + 15x^3 - 8x^2 - 4x - 15 \\
&12x^6 - 29x^5 + 29x^4 - 16x^3 - 10x^2 + 25x - 15 \\
&4x^6 - 9x^4 - 18x^3 - 23x^2 - 19x - 15 \\
&8x^6 + 16x^5 - 32x^4 + 3x^3 - 11x^2 - 12 \\
&6x^6 - 10x^5 - 15x^4 - 34x^3 - 3x^2 + 5x + 15 \\
&2x^6 + x^5 - 28x^4 + 21x^3 - 14x^2 + 3x - 12 \\
&12x^6 - 2x^5 + 13x^4 + 15x^2 - 25x - 25 \\
&6x^6 + 18x^5 + 29x^4 + x^3 - 19x^2 - 19x + 12 \\
&6x^6 + 9x^5 + 23x^4 + 14x^3 + 12x^2 - 4 \\
&5x^6 + 5x^5 + x^4 + 9x^3 - 9x^2 + 7x + 6 \\
&3x^6 - 15x^5 - 4x^4 + 28x^3 - 10x^2 - 8x + 4 \\
&5x^6 + 12x^5 - 5x^4 - 24x^3 - 6x^2 - 11x - 15 \\
&10x^6 - 12x^5 + 11x^4 - 5x^3 - 9x^2 + 9x - 2 \\
&10x^6 + 23x^5 + 21x^4 - 3x^3 - 7x^2 - 5x - 3 \\
&2x^6 + x^3 + x^2 + 2x + 1 \\
&3x^6 - 6x^5 + 21x^4 - 11x^3 + 8x^2 + 11x + 2 \\
&25x^6 - 45x^5 + 40x^4 + 32x^3 - 41x^2 + 20x + 25 \\
&4x^6 + 13x^5 - 28x^4 + 24x^3 - 10x^2 - 13x - 2 \\
&9x^6 - 6x^5 - 33x^4 + 34x^3 + 17x^2 - 40x + 16 \\
&8x^6 + 2x^5 + 4x^4 + 15x^3 - 8x^2 + 8x - 3 \\
&15x^6 - 10x^5 - 7x^4 + 34x^3 - 25x^2 + 4x + 5 \\
&4x^6 - 19x^5 + 32x^4 - 30x^3 + 21x^2 - 15x + 9 \\
&4x^6 - 13x^5 + 12x^4 - 24x^3 + 18x^2 - 9x + 4 \\
&16x^6 + 15x^4 - 18x^3 + 5x^2 - 10x + 2
\end{aligned}$$

$$\begin{aligned}
&25x^6 + 15x^5 - 5x^4 - 23x^3 - 5x^2 + 7x - 1 \\
&4x^6 - 8x^5 - 7x^4 - 15x^3 + 5x^2 + 8x - 2 \\
&4x^6 + 17x^4 - 11x^3 + 12x^2 - 11x - 4 \\
&10x^6 - 10x^5 - 7x^4 - 21x^3 - 36x^2 - 11x - 20 \\
&10x^6 - 6x^5 + 15x^4 - 16x^3 + 3x^2 - 3x + 1 \\
&3x^6 - 8x^5 - 9x^4 - 15x^3 - 2x^2 - 13x + 20 \\
&20x^6 + 41x^5 + 44x^4 + 57x^3 + 40x^2 + 20x + 16 \\
&12x^6 + 4x^5 - 17x^4 - 18x^3 - 4x^2 + 9x + 12 \\
&15x^6 + 9x^5 - 34x^4 + 16x^3 + 30x^2 - 25x + 10 \\
&4x^6 + 4x^5 - 19x^4 - 31x^2 + 10x - 10 \\
&10x^6 + 27x^5 - 16x^4 - 27x^3 - 2x^2 + 9x + 2
\end{aligned}$$

$$\begin{aligned}
&20x^6 - 9x^5 + 30x^4 + 8x^3 + 2x^2 + 7x + 2 \\
&5x^6 - 4x^5 + 8x^4 - 37x^3 + 16x^2 + 2x + 20 \\
&6x^6 + 2x^5 - 22x^4 + 39x^3 - 17x^2 + 4x + 15 \\
&9x^6 - 9x^5 - 13x^4 + 34x^3 - 13x^2 - 15x + 15 \\
&20x^6 + 45x^5 + 30x^4 + 4x^3 - 5x^2 - 4x - 12 \\
&5x^6 - 13x^5 - 10x^4 - 7x^3 - 8x^2 - 4x + 2 \\
&12x^6 + 13x^5 + 3x^4 + 27x^3 + 14x^2 + 15 \\
&8x^6 - 2x^5 - 31x^4 + 11x^3 + 15x^2 + 6x - 2 \\
&20x^6 - 24x^5 + 11x^4 + 21x^3 - 6x^2 - 11x - 4 \\
&8x^6 + 28x^5 + 14x^4 + 25x^3 + 28x^2 - 6x + 15 \\
&12x^6 + 23x^5 + 6x^4 - 27x^3 - 13x^2 + 23x - 6
\end{aligned}$$

### 3.4 일계수가 아닌 육차식 2형

$$\begin{aligned}
&75x^6 - 20x^5 - 7x^4 - 40x^3 + x^2 - 84x - 45 \\
&12x^6 - 5x^5 - 83x^4 - 198x^3 - 227x^2 - 129x - 30 \\
&20x^6 - 39x^5 + 90x^4 - 63x^3 + 16x^2 + 27x - 36 \\
&8x^6 - 42x^5 + 11x^4 + 77x^3 + 75x^2 - 16x - 48 \\
&36x^6 + 21x^5 - 47x^4 - 84x^3 - x^2 + 39x + 12 \\
&60x^6 + 105x^5 - x^4 - 57x^3 - 19x^2 + 7x + 3 \\
&27x^6 + 54x^5 + 42x^4 + 21x^3 - 28x^2 - 16x + 8 \\
&9x^6 + 48x^5 - 21x^4 - 139x^3 + 34x^2 + 61x - 12 \\
&30x^6 + 119x^5 + 29x^4 - 145x^3 - 59x^2 - 10x + 60 \\
&9x^6 - 54x^5 + 23x^4 + 56x^3 - 90x^2 + 4x + 16 \\
&60x^6 + 41x^5 + 57x^4 + 143x^3 - 39x^2 + 94x - 20 \\
&3x^6 + x^5 - 61x^4 - 2x^3 + 21x^2 + 45x - 27 \\
&20x^6 - 56x^5 - 17x^4 + 108x^3 - 16x^2 - 47x + 10 \\
&10x^6 - 27x^5 - 10x^4 - 50x^3 + 11x^2 - 36x + 30 \\
&18x^6 + 9x^5 + 24x^4 + 27x^3 - 34x^2 - 52x - 40 \\
&15x^6 + 43x^5 + 38x^4 + 73x^3 + 13x^2 + 48x + 20 \\
&75x^6 - 130x^5 - 65x^4 - 41x^3 + 118x^2 + 191x + 60 \\
&25x^6 + 160x^5 + 105x^4 + 21x^3 - 62x^2 - 29x - 12 \\
&4x^6 + 6x^5 - 63x^4 - 61x^3 + 14x^2 + 13x - 3 \\
&6x^6 - 52x^5 + 123x^4 - 128x^3 + 19x^2 + 64x - 48 \\
&32x^6 + 32x^5 - 74x^4 + 88x^3 - 113x^2 + 86x - 24 \\
&15x^6 + 14x^5 - 28x^4 - 56x^3 - 14x^2 - 84x - 15 \\
&50x^6 + 65x^5 - 79x^4 + 68x^3 - 63x^2 + 39x - 36 \\
&30x^6 + 22x^5 + 7x^4 + 150x^3 - 74x^2 + 40x - 75 \\
&15x^6 - 17x^5 - 48x^4 + 2x^3 - x^2 + 11x + 6 \\
&25x^6 + 40x^5 - 149x^4 - 122x^3 + 199x^2 + 52x - 60 \\
&36x^6 + 9x^5 + 54x^4 + 3x^3 - x^2 - 20x + 15 \\
&8x^6 - 4x^5 + 50x^4 - 21x^3 + 82x^2 - 20x + 40 \\
&3x^6 + 12x^5 - 17x^4 - 63x^3 - 26x^2 + 13x + 6 \\
&40x^6 + 90x^5 - 32x^4 + 25x^3 + 42x^2 - 24x - 9 \\
&75x^6 - 167x^4 - 45x^3 + 52x^2 + 75x + 30 \\
&40x^6 - 74x^5 - 78x^4 - 15x^3 + 41x^2 + 35x + 6 \\
&4x^6 + 12x^5 - 9x^4 - 8x^3 + 23x^2 - 16x + 3
\end{aligned}$$

$$\begin{aligned}
&50x^6 - 95x^5 - 106x^4 + 217x^3 + 13x^2 - 80x + 25 \\
&36x^6 - 33x^5 + 39x^4 - 59x^3 - 23x^2 - 36x - 20 \\
&20x^6 + 86x^5 - 75x^4 + 90x^3 - 25x^2 - 76x + 15 \\
&12x^6 - 48x^5 + 25x^4 + 133x^3 - 137x^2 - 75x + 50 \\
&100x^6 + 145x^5 - 135x^4 - 341x^3 - 225x^2 + 64x + 80 \\
&60x^6 - 191x^5 + 153x^4 - 25x^3 - 38x^2 + 106x + 40 \\
&5x^6 - 26x^5 + 3x^4 + 68x^3 + 13x^2 - 12x - 18 \\
&60x^6 + 115x^5 + 132x^4 + 128x^3 - 26x^2 + 21x - 10 \\
&24x^6 + 14x^5 - 16x^4 - x^3 - 70x^2 - 85x - 100 \\
&6x^6 + 14x^5 - 5x^4 - 64x^3 - 50x^2 + 39x + 36 \\
&8x^6 + 22x^5 + 61x^4 + 81x^3 + 95x^2 + 65x + 100 \\
&36x^6 - 15x^5 - 80x^4 - 42x^3 + 6x^2 + 17x + 6 \\
&15x^6 - 31x^5 + 106x^4 - 111x^3 + 106x^2 - 95x + 75 \\
&15x^6 + 7x^5 - 82x^4 - 47x^3 + 25x^2 + 60x + 50 \\
&36x^6 + 93x^5 + 67x^4 - x^3 - 11x^2 + 11x + 3 \\
&18x^6 - 6x^5 + 21x^4 - 20x^3 + 22x^2 - 9x + 4 \\
&25x^6 - 40x^5 - 45x^4 + 103x^3 - 94x^2 + 51x + 12 \\
&36x^6 - 114x^5 + 63x^4 + 32x^3 - 56x^2 + 15x + 10 \\
&5x^6 - 25x^5 + 24x^4 + 40x^3 - 105x^2 - 7x + 20 \\
&36x^6 + 48x^5 + 51x^4 + 116x^3 - 42x^2 + 60x - 45 \\
&20x^6 - 87x^5 + 9x^4 + 177x^3 + 3x^2 - 114x - 40 \\
&100x^6 + 175x^5 + 95x^4 - 20x^3 - 113x^2 - 51x + 12 \\
&60x^6 + 47x^5 - 128x^4 - 59x^3 - 131x^2 - 40x + 75 \\
&15x^6 - 97x^5 + 69x^4 + 59x^3 - 83x^2 - 9x + 18 \\
&10x^6 + 55x^5 + 14x^4 - 122x^3 - 139x^2 - 62x - 8 \\
&12x^6 - 69x^5 + 73x^4 + 28x^3 - 119x^2 + 145x - 60 \\
&20x^6 + 31x^5 - 62x^4 - 33x^3 + 41x^2 + 4x - 5 \\
&80x^6 - 24x^5 + 5x^4 + 15x^3 - 60x^2 - 4x + 16 \\
&6x^6 - 7x^5 - 52x^4 - 35x^3 + 85x^2 + 100x - 25 \\
&15x^6 + 69x^5 + 107x^4 + 87x^3 + 17x^2 - 33x - 12 \\
&2x^6 + 11x^5 + 28x^4 + 45x^3 + 52x^2 + 67x + 20 \\
&30x^6 - 22x^5 - 77x^4 - 17x^3 - 16x^2 - 3x + 15 \\
&3x^6 - 20x^5 + 3x^4 + 72x^3 + 170x^2 + 152x + 40
\end{aligned}$$

$$\begin{aligned}
&15x^6 + 5x^5 - 92x^4 + 9x^3 + 40x^2 + x - 3 \\
&4x^6 + 13x^5 - 57x^4 - 50x^3 + 66x^2 + 28x - 16 \\
&20x^6 - 52x^5 + 147x^4 - 180x^3 + 163x^2 - 74x + 24 \\
&15x^6 - 74x^5 + 106x^4 - 115x^3 + 72x^2 - 30x + 8 \\
&4x^6 - 11x^5 - 64x^4 + 42x^3 + 151x^2 - 56x - 16 \\
&15x^6 - 28x^5 - 43x^4 + 117x^3 - 148x^2 + 115x - 60 \\
&60x^6 - 165x^5 + 334x^4 - 382x^3 + 317x^2 - 154x + 40 \\
&20x^6 + 7x^5 - 29x^4 - 30x^3 - 32x^2 + 32x + 20 \\
&20x^6 + 64x^5 + 47x^4 - 12x^3 + x^2 + 60x - 60 \\
&30x^6 - 17x^5 + 147x^4 - 76x^3 + 250x^2 - 75x + 125 \\
&3x^6 - 4x^5 - 2x^4 - 16x^3 + 15x^2 - 20x - 12 \\
&20x^6 + 33x^5 + 85x^4 + 147x^3 - 5x^2 + 60x - 100 \\
&100x^6 - 245x^5 + 437x^4 - 467x^3 + 379x^2 - 184x + 60 \\
&6x^6 - 2x^5 + 11x^4 + 47x^3 - 89x^2 + 62x - 10 \\
&3x^6 - 2x^5 - 79x^4 - 49x^3 - 100x^2 - 155x - 50 \\
&75x^6 + 5x^5 + 31x^4 - 6x^3 - 7x^2 - 11x - 3 \\
&25x^6 - 75x^5 + 126x^4 - 73x^3 - 7x^2 + 16x - 6 \\
&48x^6 + 68x^5 - 72x^4 - 137x^3 - 140x^2 + 125 \\
&18x^6 + 63x^5 + 126x^4 + 147x^3 + 136x^2 + 70x + 40 \\
&75x^6 - 15x^5 + 62x^4 - 58x^3 - 117x^2 - 55x - 20 \\
&48x^6 + 48x^5 - 91x^4 + 7x^3 + 81x^2 - 71x + 10 \\
&20x^6 - 11x^5 + 56x^4 - 42x^3 + 82x^2 - 39x + 30 \\
&80x^6 + 4x^5 + 54x^4 - 21x^3 - 7x^2 - 8x - 12 \\
&80x^6 - 32x^5 + 83x^4 - 32x^3 + 32x^2 + 19x + 12 \\
&24x^6 - 10x^5 - 10x^4 - 19x^3 - 19x^2 - 7x - 4 \\
&8x^6 + 22x^5 - 45x^4 - 92x^3 + 72x^2 + 88x - 32 \\
&16x^6 + 12x^5 - 22x^4 + 18x^3 + x^2 - 12x + 3
\end{aligned}$$

$$\begin{aligned}
&15x^6 + x^5 - 52x^4 + 71x^3 + 37x^2 - 92x + 30 \\
&5x^6 - 7x^5 - 29x^4 + 125x^3 - 174x^2 + 132x - 80 \\
&25x^6 - 5x^5 - 27x^4 + 10x^3 - 34x^2 - 24 \\
&20x^6 + 99x^5 + 179x^4 + 96x^3 - 49x^2 - 135x - 100 \\
&24x^6 + 10x^5 + 66x^4 - 19x^3 + 62x^2 + 6x + 40 \\
&75x^6 - 75x^5 + 7x^4 + 3x^3 - 9x^2 + 13x - 6 \\
&32x^6 - 32x^5 - 54x^4 - 25x^3 + 14x^2 + 117x + 20 \\
&18x^6 + 18x^5 - 53x^4 - 88x^3 - 9x^2 + 54x + 27 \\
&50x^6 + 45x^5 - 5x^4 + 34x^3 - 7x^2 - 41x - 10 \\
&15x^6 + 74x^5 + 41x^4 - 92x^3 + 21x^2 - 6x - 5 \\
&15x^6 - 3x^5 - 35x^4 - 50x^3 - 66x^2 - 32x - 24 \\
&60x^6 - 64x^5 - 187x^4 - 81x^3 + 119x^2 + 170x + 60 \\
&5x^6 + 7x^5 + 8x^4 + 7x^3 - 5x^2 + 10x - 8 \\
&10x^6 + 25x^5 + 13x^4 - 30x^3 - 46x^2 - 40x - 40 \\
&25x^6 + 40x^5 + 47x^4 + 25x^3 + 8x^2 + x - 2 \\
&75x^6 - 155x^5 + 171x^4 - 194x^3 + 120x^2 - 88x + 16 \\
&3x^6 + 18x^5 - 5x^4 - 38x^3 + 94x^2 - 96x + 32 \\
&10x^6 + 28x^5 - 33x^4 - 51x^3 + 35x^2 + 6x - 4 \\
&24x^6 - 52x^5 + 34x^4 - 20x^3 - 31x^2 + 18x - 18 \\
&60x^6 - 31x^5 - 211x^4 - 39x^3 + 98x^2 + 10x - 12 \\
&4x^6 - 35x^5 + 51x^4 + 78x^3 + 101x^2 + 105x + 20 \\
&24x^6 - 36x^5 + 50x^4 - 19x^3 - 80x^2 + 80x - 25 \\
&8x^6 + 42x^5 + 110x^4 + 147x^3 + 98x^2 + 18x - 45 \\
&36x^6 - 12x^5 - 53x^4 + 48x^3 + 19x^2 - 20x + 3 \\
&4x^6 - 4x^5 - 4x^4 - 12x^3 + 3x^2 + 19x + 6 \\
&4x^6 - 59x^4 + 9x^3 + 145x^2 + 15x - 50 \\
&9x^6 + 51x^5 + 73x^4 + 58x^3 - 85x^2 - 125x - 125
\end{aligned}$$

# 4. 칠차식의 인수분해

## 4.1 일계수 칠차식

$$\begin{aligned} & x^7 + 4x^6 - 3x^5 + 11x^4 + 52x^3 - 45x^2 - 56x - 12 \\ & x^7 + 3x^6 - 26x^5 - 92x^4 - 74x^3 + 64x^2 + 69x - 15 \\ & \quad x^7 + 2x^6 + 9x^5 + 6x^4 + 17x^3 - 5x^2 + 9x - 9 \\ & x^7 - 6x^6 + 12x^5 - 21x^4 + 8x^3 + 19x^2 - 81x - 20 \\ & \quad x^7 - 17x^5 - 35x^4 - 63x^3 + 16x^2 - 24x + 24 \\ & x^7 + 4x^6 - 20x^5 - 99x^4 - 70x^3 + 55x^2 + 125x + 125 \\ & \quad x^7 - 4x^6 + x^5 + 12x^4 - 41x^3 + 38x^2 + 10x - 12 \\ & \quad \quad x^7 - 3x^5 + x^4 - 3x^3 + 24x^2 - 46x + 24 \\ & x^7 + 11x^6 + 40x^5 + 58x^4 + 20x^3 - 99x^2 - 86x + 20 \\ & x^7 + 5x^6 - 15x^5 - 62x^4 + 27x^3 + 112x^2 - 102x + 24 \\ & \quad x^7 + 3x^6 - 7x^5 + 12x^4 - 13x^3 + 90x^2 - 92x + 48 \\ & x^7 - 3x^6 - 21x^5 + 109x^4 - 173x^3 + 75x^2 + 9x - 5 \\ & x^7 - 2x^6 - 30x^5 + 21x^4 + 148x^3 + 126x^2 - 16x - 32 \\ & \quad x^7 - x^6 - 7x^5 - 9x^4 - 5x^3 - 51x^2 + 6x + 36 \\ & x^7 - 3x^6 - 20x^5 + 16x^4 + 32x^3 - 75x^2 - 10x + 50 \\ & x^7 - 3x^6 - 21x^5 + 31x^4 + 59x^3 - 81x^2 - 110x - 30 \\ & \quad x^7 - 3x^6 - 8x^5 - x^4 + 47x^3 + 40x^2 + 20x - 16 \\ & x^7 - 2x^6 - 12x^5 + 10x^4 + 18x^3 - 34x^2 - 41x - 10 \\ & \quad x^7 - 5x^6 + 7x^5 - 6x^4 - 39x^3 + 19x^2 - 45x - 100 \\ & \quad x^7 - 4x^6 - 3x^5 + 20x^4 - 13x^3 + 6x^2 + 30x + 8 \\ & \quad x^7 + 6x^6 + 2x^5 - 37x^4 - 75x^3 - 60x^2 + 4x + 15 \\ & x^7 + x^6 - 28x^5 - 61x^4 + 20x^3 - 14x^2 - 51x - 12 \\ & \quad x^7 + 4x^6 + 15x^5 + 26x^4 + 46x^3 + 32x^2 + 8x - 32 \\ & x^7 + 10x^6 + 31x^5 + 38x^4 + 37x^3 - 33x^2 - 33x + 9 \\ & \quad x^7 - 2x^5 - 7x^4 + 7x^3 + 20x^2 - 110x + 75 \\ & \quad x^7 - x^6 - 6x^5 - x^4 + 19x^3 + 27x^2 - 30x - 45 \\ & x^7 - 5x^6 - 9x^5 + 35x^4 - 15x^3 - 111x^2 - 80x - 16 \\ & \quad x^7 - 4x^6 - 29x^5 + 124x^4 - 44x^3 + 11x^2 + x - 6 \\ & x^7 + 5x^6 + 6x^5 + 20x^4 + 13x^3 + 50x^2 + 135x + 50 \\ & \quad x^7 - 8x^6 + 16x^5 + 8x^4 - 26x^3 - 26x^2 + 25x + 20 \\ & \quad \quad x^7 - 5x^5 - 4x^4 - 30x^3 + 55x^2 + 95x - 100 \\ & x^7 - 8x^6 + 17x^5 - 16x^4 - 19x^3 + 17x^2 - 35x + 25 \\ & \quad x^7 - 3x^6 - 11x^5 + 10x^4 + 26x^3 - 12x^2 - 16x + 8 \\ & \quad \quad x^7 - 9x^6 + 16x^5 + 30x^3 + 255x^2 + 300x + 100 \end{aligned}$$

$$\begin{aligned} & x^7 + 6x^6 + x^5 - 13x^4 - 44x^3 + 45x^2 + 16x - 16 \\ & \quad x^7 + 6x^6 + 6x^5 - 27x^4 - 96x^3 - 118x^2 - 68x - 16 \\ & x^7 + 15x^6 + 66x^5 + 38x^4 - 169x^3 + 187x^2 - 114x + 24 \\ & \quad x^7 + 3x^6 - 21x^5 - 66x^4 + 3x^3 + 6x^2 - 10x + 3 \\ & x^7 + 3x^6 - 31x^5 - 102x^4 - 107x^3 + 10x^2 + 60x + 75 \\ & \quad x^7 + x^6 - 5x^5 - 2x^4 + 4x^3 - 2x^2 + 4x + 4 \\ & \quad x^7 + 5x^6 + 17x^5 + 29x^4 + 38x^3 + 19x^2 + 22x - 5 \\ & \quad x^7 - 2x^6 - 7x^5 + 8x^4 + 19x^3 - 2x^2 - 22x - 10 \\ & \quad x^7 - 4x^6 - 23x^5 + 77x^4 + 38x^3 - 5x^2 + 8x + 4 \\ & x^7 - 4x^6 - 13x^5 + 58x^4 - 56x^3 - 97x^2 + 165x - 60 \\ & \quad x^7 + 9x^6 + 11x^5 - 65x^4 - 86x^3 + 79x^2 + 4x - 3 \\ & \quad x^7 - 4x^6 - 8x^5 + 42x^4 - 85x^3 + 26x^2 + 20x - 8 \\ & \quad x^7 + 6x^6 - 14x^5 - 75x^4 + 67x^3 - 4x^2 - 6x + 1 \\ & \quad x^7 + 3x^6 + 3x^5 + 7x^4 + 7x^3 + x^2 + 5x - 3 \\ & x^7 + 5x^6 + 10x^5 + 17x^4 + 17x^3 + 10x^2 + 44x + 16 \\ & \quad x^7 - 2x^6 + x^5 - 18x^4 - 13x^3 - 81x^2 - 123x - 45 \\ & x^7 - 6x^6 + 8x^5 - 13x^4 + 5x^3 + 110x^2 - 50x + 125 \\ & \quad x^7 - x^6 - 12x^5 - 16x^4 - 10x^3 + 52x^2 + 60x + 16 \\ & \quad x^7 - 7x^6 + 78x^4 - 122x^3 - 8x^2 + 61x - 15 \\ & x^7 + 4x^6 - 10x^5 - 50x^4 - 102x^3 - 34x^2 - 51x - 10 \\ & \quad x^7 - 8x^6 + 8x^5 + 55x^4 - 86x^3 - 43x^2 + 117x - 45 \\ & x^7 + 10x^6 + 24x^5 - 27x^4 - 110x^3 - 6x^2 + 32x + 40 \\ & \quad x^7 - 8x^5 - 12x^4 - 34x^3 - 46x^2 - 3x + 12 \\ & \quad x^7 - 5x^6 + 7x^5 - 24x^4 + 22x^3 - 32x^2 + 32x + 24 \\ & \quad x^7 - 10x^5 - 5x^4 - 3x^3 - 10x^2 + 8x - 5 \\ & x^7 + 4x^6 - 33x^5 - 143x^4 + 18x^3 + 151x^2 - 28x - 12 \\ & \quad x^7 - 16x^5 + 77x^4 - 147x^3 + 158x^2 - 50x - 15 \\ & \quad x^7 - 4x^6 + 12x^5 - 23x^4 + 36x^3 - 48x^2 + 76x - 80 \\ & \quad x^7 + 7x^6 + 11x^5 - 5x^4 + 15x^3 + 55x^2 - 50x - 100 \\ & \quad x^7 - 2x^6 - 16x^5 - 7x^4 - 16x^3 - 46x^2 + 28x + 16 \\ & x^7 + 5x^6 - 23x^5 - 179x^4 - 325x^3 - 125x^2 + 150x + 100 \\ & \quad x^7 - 3x^6 - 21x^5 + 39x^4 + 98x^3 + 57x^2 - 60x - 45 \\ & \quad x^7 + 8x^6 + 13x^5 - 23x^4 - 110x^3 - 81x^2 + 100x - 20 \\ & \quad \quad x^7 - x^6 - x^5 - 14x^4 + x^3 - 49x^2 + 5x - 50 \end{aligned}$$

$$\begin{aligned}
& x^7 + 7x^6 + 10x^5 - 6x^4 + 7x^3 + 25x^2 - 26x + 6 \\
& x^7 + 7x^6 + 11x^5 - 12x^4 - 48x^3 + 4x^2 + 44x - 16 \\
& x^7 + 7x^6 + 14x^5 + 20x^4 + 24x^3 + 42x^2 + 51x + 9 \\
& x^7 - 5x^6 + 10x^5 - 6x^4 - 20x^3 + 45x^2 - 42x + 20 \\
& x^7 - 7x^6 + 13x^5 - 22x^4 + 47x^3 + 67x^2 + 35x + 10 \\
& x^7 + x^6 - 25x^5 - 28x^4 + 67x^3 + 24x^2 - 22x + 3 \\
& x^7 + 2x^6 - 16x^5 - 52x^4 - 53x^3 - 4x^2 + 26x - 4 \\
& x^7 - 6x^6 + 14x^5 - 24x^4 + 27x^3 - 36x^2 + 40x + 8 \\
& x^7 + 6x^6 + 4x^5 + 9x^4 + 6x^3 + 132x^2 - 192x + 64 \\
& x^7 - 2x^6 - 20x^5 - 10x^4 + 106x^3 + 182x^2 + 83x + 10 \\
& x^7 + 7x^6 + 17x^5 + 13x^4 - 17x^3 - 43x^2 - 24x - 4 \\
& x^7 - 16x^5 + 59x^4 - 88x^3 + 58x^2 + 4x - 16 \\
& x^7 + 7x^5 - x^4 + 28x^3 - 33x^2 + 58x - 40 \\
& x^7 + 11x^6 + 41x^5 + 63x^4 + 50x^3 + 47x^2 + 66x + 15 \\
& x^7 + 6x^6 + 13x^5 + 10x^4 - 19x^3 - 66x^2 - 84x - 36 \\
& x^7 - x^6 - 11x^5 + 17x^4 - 29x^3 + 29x^2 - 24x + 12 \\
& x^7 - 3x^6 - x^5 - 11x^4 - 2x^3 + 55x^2 - 12x + 15 \\
& x^7 - 5x^6 - 11x^5 + 48x^4 + 17x^3 - 79x^2 - 13x + 6 \\
& x^7 + 4x^6 - x^5 + 5x^4 + 38x^3 - 19x^2 - 2x + 4 \\
& x^7 - 8x^6 + 20x^5 - 20x^4 + 4x^3 + 50x^2 + 9x - 6 \\
& x^7 + 8x^6 + 18x^5 + 35x^4 + 74x^3 + 4x^2 + 72x - 32 \\
& x^7 + 2x^6 - x^5 + 4x^4 - 3x^3 - 20x^2 - 26x - 20 \\
& x^7 + 5x^6 + x^5 + 6x^4 + 13x^3 - 7x^2 + 7x - 6 \\
& x^7 - 4x^6 + 3x^5 - 28x^4 + 12x^3 - 5x^2 + 25x - 10 \\
& x^7 + 5x^6 + x^5 + 19x^4 - 4x^3 + 22x^2 - 4x + 8 \\
& x^7 - 11x^6 + 38x^5 - 38x^4 - 18x^3 + 51x^2 - 4x - 12
\end{aligned}$$

## 4.2 일계수가 아닌 칠차식

$$\begin{aligned}
& 100x^7 - 100x^6 + 165x^5 - 140x^4 + 138x^3 - 93x^2 - 35x + 25 \\
& 20x^7 - 4x^6 - 121x^5 - 42x^4 + 86x^3 + 44x^2 + 53x - 60 \\
& 60x^7 + 78x^6 + 19x^5 - 2x^3 + 6x^2 - 11x - 6 \\
& 2x^7 + 4x^6 - x^5 + 24x^4 - 37x^3 - 64x^2 - 6x + 8 \\
& 60x^7 + 34x^6 - 111x^5 + 80x^4 - 28x^3 - 22x^2 + 9x + 3 \\
& 20x^7 - 2x^6 + 72x^5 + 71x^4 + 25x^3 + 46x^2 - 28x + 16 \\
& 50x^7 + 20x^6 + 55x^5 - 61x^4 + 94x^3 - 113x^2 + 17x - 20 \\
& 100x^7 - 225x^6 + 64x^5 + 13x^4 - 44x^3 + 49x^2 - 5 \\
& 36x^7 + 93x^6 + 159x^5 + 85x^4 - 51x^3 - 198x^2 - 164x - 80 \\
& 36x^7 - 9x^6 - 94x^5 - 45x^4 - 121x^3 + 24x^2 - 91x - 60 \\
& 24x^7 + 80x^6 + 40x^5 - 159x^4 - 238x^3 - 24x^2 + 70x + 15 \\
& 4x^7 - 30x^6 + 25x^5 + 78x^4 + 15x^3 - 15x^2 - 150x - 125 \\
& 2x^7 - 9x^6 + 21x^5 - 60x^4 + 51x^3 - 71x^2 + 2x + 40 \\
& 8x^7 - 26x^6 + 48x^5 - 53x^4 + 49x^3 - 54x^2 + 11x + 15 \\
& 24x^7 - 74x^6 + 105x^5 - 147x^4 + 124x^3 - 61x^2 + 53x + 12 \\
& 10x^7 - 35x^6 - 119x^5 - 110x^4 - 11x^3 + 51x^2 + 50x + 20 \\
& 2x^7 + 7x^6 + 11x^5 + 14x^4 + 8x^3 + 8x^2 + 4x + 16 \\
& 48x^7 + 60x^6 + 162x^5 + 209x^4 + 212x^3 + 260x^2 + 100x + 125
\end{aligned}$$

$$\begin{aligned}
& x^7 - 8x^6 + 24x^5 - 42x^4 + 40x^3 - 6x^2 - 33x + 18 \\
& x^7 + 7x^6 + 14x^5 + 14x^4 + 46x^3 + 67x^2 + 8x - 10 \\
& x^7 + 9x^6 + 13x^5 - 43x^4 - 42x^3 + 90x^2 - 60x + 16 \\
& x^7 - 3x^6 - 14x^5 - 12x^4 + 5x^3 + 82x^2 + 105x + 36 \\
& x^7 + 6x^6 + 2x^5 - 28x^4 - 112x^3 - 138x^2 - 21x + 10 \\
& x^7 - 18x^5 + 33x^4 + 35x^3 - 140x^2 + 150x - 125 \\
& x^7 - 7x^6 + 7x^5 + 27x^4 - 31x^3 + 5x^2 + 20x - 50 \\
& x^7 - 5x^6 - 5x^5 + 35x^4 + 22x^3 - 200x^2 + 172x - 40 \\
& x^7 - 10x^6 + 31x^5 - 22x^4 - 46x^3 + 85x^2 + 23x - 20 \\
& x^7 - 6x^6 + 8x^5 - 4x^4 + 22x^3 - 54x^2 + 21x + 18 \\
& x^7 - 12x^6 + 55x^5 - 126x^4 + 149x^3 - 53x^2 - 13x + 5 \\
& x^7 + 4x^6 + x^5 + 3x^4 + 5x^3 - 13x^2 + 3 \\
& x^7 + x^6 - 5x^5 - 4x^4 + 4x^3 + 10x^2 + 4x - 12 \\
& x^7 - 2x^6 - 17x^5 + 35x^4 - 82x^3 - 19x^2 + 36x - 6 \\
& x^7 - 7x^6 + 2x^5 + 48x^4 - 111x^3 + 70x^2 + 33x - 60 \\
& x^7 + 5x^6 - 7x^5 - 46x^4 + 2x^3 + 43x^2 + 18x + 2 \\
& x^7 - 3x^6 - 27x^5 + 43x^4 + 111x^3 - 65x^2 + 20x + 100 \\
& x^7 + 5x^6 + 6x^5 + x^4 - 11x^3 + 10x^2 - 44x - 40 \\
& x^7 + 2x^6 - 14x^5 - 60x^4 - 72x^3 + 42x^2 + 115x - 50 \\
& x^7 + 5x^6 - 7x^5 - 31x^4 - 92x^3 - 64x^2 + 56x + 32 \\
& x^7 - x^6 - 12x^5 - 20x^4 + 18x^3 + 131x^2 + 166x + 60 \\
& x^7 - 30x^5 - 23x^4 + 106x^3 + 109x^2 + 95x + 30 \\
& x^7 + 5x^6 + 10x^5 + 14x^4 - 2x^3 - 33x^2 + 2x + 10 \\
& x^7 + x^6 - 12x^5 - 12x^4 + 14x^3 + 21x^2 + 6x - 4 \\
& x^7 + 9x^6 + 23x^5 + 31x^4 + 25x^3 - 93x^2 - 22x + 40 \\
& x^7 + 12x^6 + 41x^5 + 7x^4 - 122x^3 - 23x^2 + 58x + 12
\end{aligned}$$

$$\begin{aligned}
& 40x^7 + 62x^6 - 27x^5 - 193x^4 - 113x^3 - 9x^2 + 45x + 15 \\
& 4x^7 - 8x^6 + 4x^5 + 52x^4 - 121x^3 + 96x^2 + 7x - 30 \\
& 40x^7 - 22x^6 - 86x^5 + 187x^4 + 53x^3 - 269x^2 + 100 \\
& 60x^7 - 47x^6 - 33x^5 + 124x^4 - 94x^3 + 32x^2 - 56x + 32 \\
& 80x^7 + 180x^6 + 74x^5 + 45x^4 + 132x^3 + 15x^2 - 36x + 5 \\
& 24x^7 + 4x^6 + 8x^5 - 8x^4 - 4x^3 - 15x^2 - 3x + 9 \\
& 75x^7 + 20x^6 - 155x^5 - 109x^4 + 62x^3 + 27x^2 - 30x + 50 \\
& 60x^7 + 4x^6 - 135x^5 + 38x^4 + 85x^3 - 44x^2 - 22x + 8 \\
& 80x^7 - 104x^6 - 120x^5 + 106x^4 + 5x^3 + 130x^2 + 25x - 125 \\
& 10x^7 + 14x^6 + 7x^5 - 80x^4 - 178x^3 - 92x^2 + 9x + 10 \\
& 4x^7 + 5x^6 - 99x^5 - 90x^4 - 21x^3 - 59x^2 + 96x - 16 \\
& 32x^7 - 40x^6 + 52x^5 - 42x^4 - 13x^3 + 2x^2 - 14x - 3 \\
& 60x^7 - 49x^6 - 23x^5 + 79x^4 - 28x^3 + 19x^2 - 38x - 60 \\
& 12x^7 + 32x^6 - 57x^5 - 101x^4 + 108x^3 - 80x^2 - 15x + 5 \\
& 50x^7 - 50x^6 + 113x^5 - 130x^4 + 33x^3 - 165x^2 - 40x - 75 \\
& 12x^7 + 44x^6 + 85x^5 + 109x^4 + 96x^3 + 66x^2 + 27x + 9 \\
& 6x^7 - 8x^6 + 4x^5 - 23x^4 + 59x^3 - 18x^2 + 33x - 45 \\
& 6x^7 - 24x^6 - 25x^5 + 133x^4 - 28x^3 - 123x^2 + 28x + 30
\end{aligned}$$



$$\begin{aligned}
& 50x^7 + 30x^6 - 191x^5 - 65x^4 + 195x^3 - 43x^2 - 75x + 45 \\
& 125x^7 - 175x^6 + 35x^5 + 45x^4 - 5x^3 - x^2 - 8x - 2 \\
45x^7 & + 132x^6 + 266x^5 + 258x^4 + 197x^3 - 22x^2 - 36x - 40 \\
& 12x^7 + 15x^6 - 52x^5 - 56x^4 + 72x^3 + 60x^2 - 32x - 16 \\
& 15x^7 + 20x^6 + 54x^5 - 27x^4 + 35x^3 - 45x^2 + 30x - 12 \\
& 30x^7 - 62x^6 + 9x^5 - 14x^4 + 86x^3 - 33x^2 - 14x + 4 \\
& 12x^7 - 68x^6 + 151x^5 - 154x^4 + 47x^3 + 32x^2 - 19x - 4 \\
& 40x^7 - 108x^6 + 102x^5 - 37x^4 - 72x^3 + 52x^2 - 17x - 10 \\
& 60x^7 + 25x^6 - 34x^5 + 15x^4 - 141x^3 + 65x^2 + 58x - 30 \\
10x^7 & - 63x^6 + 124x^5 - 214x^4 + 242x^3 - 140x^2 + 140x - 75 \\
& 75x^7 - 80x^6 - 79x^5 + 133x^4 - 152x^3 + 93x^2 - 18x + 40 \\
& 60x^7 + 37x^6 - 67x^5 - 139x^4 - 92x^3 + 254x^2 - 20x - 40 \\
& 32x^7 + 16x^6 - 80x^5 - 80x^4 + 6x^3 + 127x^2 + 95x - 25 \\
& 20x^7 - 109x^6 + 98x^5 - 166x^4 + 2x^3 - 28x^2 - 36x + 9 \\
& 30x^7 - 13x^6 - 114x^5 - 199x^4 + 28x^3 + 39x^2 + 32x + 5 \\
& 20x^7 - 65x^6 + 67x^5 + 14x^4 - 194x^3 + 197x^2 + 55x - 30 \\
& 3x^7 + 4x^6 + 11x^4 - 43x^3 - 5x^2 + 20x + 60 \\
9x^7 & - 36x^6 - 55x^5 + 184x^4 - 116x^3 - 139x^2 + 195x - 60 \\
& 10x^7 + 61x^6 + 133x^5 + 146x^4 + 46x^3 - 70x^2 - 63x - 20 \\
& 20x^7 + 13x^6 + 79x^5 + 19x^4 - 101x^3 - 214x^2 + 20x + 80 \\
& 8x^7 + 18x^6 + 20x^5 - 27x^4 - 39x^3 - 75x^2 + 27x + 36 \\
& 16x^7 + 56x^6 - 47x^5 + 4x^4 + 73x^3 - 75x^2 + 51x - 18 \\
& 60x^7 + 86x^6 - 23x^5 + 2x^4 + 6x^3 - 111x^2 - 16x + 48 \\
& 4x^7 + 10x^6 - 23x^5 - 24x^4 + 27x^3 + 9x^2 + 6x - 2 \\
& 60x^7 - 78x^6 + 163x^5 - 84x^4 + 90x^3 - 15x^2 + 4x + 10 \\
& 36x^7 - 9x^6 + 95x^5 + 20x^4 + 74x^3 + 31x^2 + 35x + 6 \\
& 30x^7 + 63x^6 - 133x^5 - 82x^4 - 87x^3 - 41x^2 + 90x + 40 \\
& 30x^7 + 26x^6 - 33x^5 - 63x^4 - 5x^3 + 4x^2 - x + 6 \\
& 18x^7 + 3x^6 + 74x^5 + 25x^4 + 78x^3 + 42x^2 + 16x + 32 \\
& 16x^7 - 52x^6 + 58x^5 + 16x^4 - 101x^3 + 79x^2 - 45x + 50 \\
& 32x^7 - 54x^5 - 31x^4 + 115x^3 - 158x^2 - 195x - 45 \\
& 6x^7 + 29x^6 - 29x^5 - 53x^4 + 51x^3 - 2x^2 - 14x + 4 \\
& 3x^7 + 4x^6 - 52x^5 + 156x^4 - 58x^3 - 182x^2 + 55x + 60 \\
& 32x^7 + 56x^6 - 68x^5 - 88x^4 - 66x^3 + 37x^2 + 22x + 40 \\
& 10x^7 - 37x^6 - 20x^5 + 91x^4 + 56x^3 + 108x^2 - 32x - 64 \\
& 40x^7 + 22x^6 + 15x^5 - 10x^4 - 19x^3 - 2x^2 - 2x + 4 \\
& 12x^7 + 6x^6 - 51x^5 - 40x^4 + 40x^3 + 70x^2 + 15x - 12 \\
& 4x^7 + 4x^6 - 47x^5 + 26x^4 - 34x^3 - 12x^2 + 13x - 2 \\
3x^7 & + 14x^6 - 20x^5 - 144x^4 - 214x^3 - 154x^2 - 69x - 10 \\
& 64x^7 + 16x^6 - 100x^5 + 7x^4 - 48x^3 + 42x^2 + 11x - 6 \\
& 15x^7 - 50x^6 - 9x^5 - 35x^4 - 96x^3 - 51x^2 - 36x - 18 \\
& 75x^7 + 65x^6 + 2x^5 + 24x^4 + 14x^3 - 127x^2 - 138x - 36
\end{aligned}$$

$$\begin{aligned}
& 16x^7 - 16x^6 - 56x^5 - 106x^4 - 132x^3 + 25x^2 + 85x + 100 \\
& 15x^7 - 78x^6 + 37x^5 + 55x^4 - 124x^3 + 53x^2 + 14x - 8 \\
& 5x^7 + 11x^6 - 61x^5 + 77x^3 - 65x^2 - 9x + 18 \\
& 2x^7 + 5x^6 - 29x^5 - 44x^4 - 90x^3 - 63x^2 + 54x + 45 \\
& 10x^7 + 9x^6 + 41x^5 + 9x^4 + 40x^3 + 3x^2 + 11x - 3 \\
& 3x^7 + 20x^6 + 29x^5 + 59x^4 + 88x^3 - 99x^2 + 80x - 60 \\
& 15x^7 - 72x^6 - 53x^5 + 96x^4 + 107x^3 + 12x^2 - 84x - 16 \\
& 30x^7 - 31x^6 + 35x^5 + 2x^4 - 151x^3 + 50x^2 - 52x - 15 \\
& 6x^7 + 27x^6 - 10x^5 - 73x^4 - 100x^3 + 11x^2 + 44x - 10 \\
125x^7 & + 275x^6 + 365x^5 + 325x^4 + 199x^3 + 85x^2 + 23x + 3 \\
& 10x^7 + 10x^6 + 47x^5 - 3x^4 + 29x^3 - 6x^2 + 4x - 1 \\
& 20x^7 + 60x^6 - 101x^5 - 144x^4 + 15x^3 + 78x^2 + 17x - 10 \\
& 6x^7 - 24x^6 - 55x^5 + 13x^4 - 24x^3 + 24x^2 + 80x - 48 \\
& 75x^7 + 110x^6 - 31x^5 - 92x^4 + 38x^3 - 12x^2 - 24x + 16 \\
& 50x^7 + 60x^6 - 37x^5 - 53x^4 - 138x^3 + 29x^2 + 5x + 60 \\
& 24x^7 + 70x^6 + 15x^5 - 84x^4 - 49x^3 + 60x^2 - 36x + 16 \\
& 32x^7 - 80x^6 + 34x^5 - 40x^4 + 15x^3 + 89x^2 + 58x + 60 \\
& 30x^7 + 140x^6 + 289x^5 + 338x^4 + 189x^3 + 71x^2 + x + 20 \\
& 48x^7 - 128x^6 + 45x^5 - 16x^4 + 5x^3 - 85x^2 + 75 \\
& 15x^7 + 52x^6 + 115x^5 + 107x^4 - 76x^3 - 69x^2 - 8x + 4 \\
& 6x^7 - 29x^6 + 30x^5 - 27x^4 + 22x^3 + 9x^2 + 30x - 9 \\
& 4x^7 - 20x^6 - 20x^5 + 117x^4 + 74x^3 - 38x^2 + 68x + 40 \\
& 16x^7 - 44x^6 + 78x^5 - 66x^4 - 30x^3 + 79x^2 - 69x - 30 \\
& 4x^7 + 22x^6 + 12x^5 - 21x^4 + 18x^3 + 29x^2 - 20x - 12 \\
& 80x^7 - 68x^6 + 30x^5 - 4x^4 - 55x^3 + 96x^2 - 73x + 30 \\
& 6x^7 + 7x^6 - 19x^5 - 52x^4 - 63x^3 + 36x^2 + 79x - 15 \\
& 32x^7 - 32x^6 - 50x^5 + 66x^4 - 43x^3 - x^2 + 24x - 4 \\
& 40x^7 - 110x^6 - 49x^5 + 169x^4 + 163x^3 - 61x^2 - 144x - 48 \\
& 4x^7 - 10x^6 - 77x^5 + 86x^4 - 18x^3 - 19x^2 + 12x + 4 \\
& 9x^7 + 9x^6 + 5x^5 + 14x^4 - 65x^3 - 87x^2 + 3x + 4 \\
& 16x^7 + 24x^6 - 20x^5 + 4x^4 + 44x^3 - 56x^2 - 39x + 36 \\
& 24x^7 - 38x^6 + 82x^5 - 41x^4 + 95x^3 + 33x^2 - 15x + 100 \\
& 25x^7 + 30x^6 + 48x^5 + 123x^4 + 4x^3 - 47x^2 - 29x - 10 \\
& 75x^7 + 210x^6 + 170x^5 - 72x^4 - 215x^3 - 19x^2 + 96x - 20 \\
& 60x^7 + 163x^6 - 66x^5 - 260x^4 + 199x^3 + 144x^2 - 188x + 48 \\
& 6x^7 - 33x^6 + 23x^5 + 23x^4 - 3x^3 - 20x^2 - 80x + 64 \\
& 20x^7 - 82x^6 + 98x^5 - 27x^4 - 164x^3 + 44x^2 + 61x + 10 \\
& 24x^7 - 74x^6 + 143x^5 - 108x^4 + 14x^3 + 77x^2 - 21x - 15 \\
& 60x^7 + 105x^6 - 46x^5 - 93x^4 - 48x^3 + 21x^2 - 8x + 30 \\
& 10x^7 - 29x^6 - 165x^5 + 30x^4 + 35x^3 - 191x^2 - 50x + 40 \\
& 100x^7 - 205x^6 + 210x^5 - 107x^4 - 78x^3 + 120x^2 - 104x - 80 \\
& 40x^7 - 72x^6 - 32x^5 + 113x^4 - 74x^3 + 13x^2 + 8x - 2
\end{aligned}$$

II

정답

# 5. 사차식의 인수분해

## 5.1 일계수 사차식

$(x^2 + 4)(x^2 - 2x - 5)$	$(x^2 + 2x + 4)(x^2 + 4x - 2)$	$(x^2 - 2x + 5)(x^2 + 4x + 1)$
$(x^2 - x - 5)(x^2 + 2)$	$(x^2 - 2x - 2)(x^2 - 2)$	$(x^2 - 2x - 1)(x^2 - 5)$
$(x^2 + 5)(x^2 + 5x + 1)$	$(x^2 + 4x - 4)(x^2 - 5x + 2)$	$(x^2 - x - 1)(x^2 - 3x - 1)$
$(x^2 + x - 4)(x^2 - 3x - 1)$	$(x^2 + 4x - 3)(x^2 + 3x + 1)$	$(x^2 + 2x + 2)(x^2 - 2x + 5)$
$(x^2 + x + 1)(x^2 + 4)$	$(x^2 + 5x - 1)(x^2 + 5x - 1)$	$(x^2 - x + 1)(x^2 - 5x + 1)$
$(x^2 + 2x - 2)(x^2 - x - 3)$	$(x^2 + 3x + 4)(x^2 + 3)$	$(x^2 - 2x - 4)(x^2 + 4x - 4)$
$(x^2 - 3)(x^2 + 5x - 4)$	$(x^2 + x - 1)(x^2 + 4x - 3)$	$(x^2 - 2x - 4)(x^2 + 3x - 5)$
$(x^2 - 2x - 2)(x^2 - 4x - 2)$	$(x^2 + 2x - 2)(x^2 - 5x + 5)$	$(x^2 - 2x - 2)(x^2 - 3)$
$(x^2 - 3x + 3)(x^2 - 2x - 5)$	$(x^2 - 4x - 2)(x^2 - 5x + 3)$	$(x^2 + 2x - 4)(x^2 + 3x - 2)$
$(x^2 - 2x + 4)(x^2 + 5x + 2)$	$(x^2 - 3x - 3)(x^2 - 5x - 1)$	$(x^2 + 4x + 1)(x^2 + x + 1)$
$(x^2 - x - 1)(x^2 + x + 5)$	$(x^2 + 2x + 5)(x^2 - 3x - 3)$	$(x^2 + x + 4)(x^2 - x - 1)$
$(x^2 + x - 1)(x^2 + 3x - 2)$	$(x^2 + 2x + 4)(x^2 - 2x - 4)$	$(x^2 + 5x - 1)(x^2 + 4x + 1)$
$(x^2 + 4x + 2)(x^2 - 5x + 5)$	$(x^2 - 3x - 2)(x^2 + 3x + 5)$	$(x^2 + x - 1)(x^2 + 4x + 1)$
$(x^2 + 4x + 5)(x^2 + 2x + 5)$	$(x^2 - 5x + 2)(x^2 - 5x - 1)$	$(x^2 - 3x - 5)(x^2 - 4x - 2)$
$(x^2 - 5x - 2)(x^2 + 5x - 2)$	$(x^2 + x - 1)(x^2 + 3x + 4)$	$(x^2 + 5x + 3)(x^2 - 5x + 2)$
$(x^2 + x + 4)(x^2 + 4)$	$(x^2 + 3x - 3)(x^2 - 4x + 1)$	$(x^2 - 5x + 5)(x^2 + 2x + 2)$
$(x^2 + x + 2)(x^2 - x + 3)$	$(x^2 - 4x + 5)(x^2 + x + 5)$	$(x^2 - 2x + 4)(x^2 - 5x + 3)$
$(x^2 - 3x + 1)(x^2 + 2x - 5)$	$(x^2 + 4x + 1)(x^2 + 4x - 2)$	$(x^2 + 2x - 4)(x^2 - 4x + 2)$
$(x^2 + 1)(x^2 + 5x + 5)$	$(x^2 + 4x - 1)(x^2 - 3x - 1)$	$(x^2 - 3x + 5)(x^2 - 2x - 1)$
$(x^2 - 2x + 5)(x^2 - 4x + 5)$	$(x^2 + 5x - 3)(x^2 + 5x + 1)$	$(x^2 - x - 5)(x^2 - 3x + 4)$
$(x^2 + 3x + 4)(x^2 + 4x - 4)$	$(x^2 - x + 1)(x^2 - 3x - 2)$	$(x^2 + x + 1)(x^2 - 2x + 5)$
$(x^2 + 5x - 5)(x^2 - x + 5)$	$(x^2 - 5x + 5)(x^2 - 4x - 1)$	$(x^2 - 2x + 2)(x^2 + 5x - 3)$
$(x^2 + 4x - 3)(x^2 - x + 1)$	$(x^2 + x - 5)(x^2 - x + 1)$	$(x^2 + 4x - 3)(x^2 + 5x + 3)$
$(x^2 - x - 1)(x^2 + x - 3)$	$(x^2 - 2x + 2)(x^2 - x + 2)$	$(x^2 - 2x - 4)(x^2 - 2x - 1)$
$(x^2 + x - 3)(x^2 + 2x + 3)$	$(x^2 - 3x + 1)(x^2 + 4x - 3)$	$(x^2 + 4x - 4)(x^2 + 3x + 1)$
$(x^2 + 4x + 5)(x^2 + x - 3)$	$(x^2 - 2x + 4)(x^2 + 3x + 1)$	$(x^2 + 3x - 3)(x^2 + x + 2)$
$(x^2 - 2)(x^2 - x - 5)$	$(x^2 + x - 3)(x^2 - 3x + 1)$	$(x^2 + 5)(x^2 + 4x - 3)$
$(x^2 - 5x - 4)(x^2 - 5x - 1)$	$(x^2 + 5x + 2)(x^2 - 3x - 5)$	$(x^2 - 5x - 5)(x^2 - 3x - 3)$
$(x^2 - 5x - 2)(x^2 + 1)$	$(x^2 + 5x + 1)(x^2 - 2x + 5)$	$(x^2 + x + 4)(x^2 + x + 1)$
$(x^2 + x - 5)(x^2 + x - 3)$	$(x^2 - 2)(x^2 - 5x - 5)$	$(x^2 - 5)(x^2 + x + 3)$
$(x^2 - 3x + 4)(x^2 + 2x + 4)$	$(x^2 - 5x + 1)(x^2 + 2x + 5)$	$(x^2 - 4x - 3)(x^2 - 3x - 1)$
$(x^2 - x - 1)(x^2 - 5x - 5)$	$(x^2 - 5x + 2)(x^2 - 5x + 3)$	$(x^2 + x - 3)(x^2 - x + 1)$
$(x^2 + 3x - 1)(x^2 + 5x + 2)$	$(x^2 - 2x - 2)(x^2 + 2x - 4)$	$(x^2 - 5x + 5)(x^2 - 2x - 2)$
$(x^2 - x - 3)(x^2 + 4x + 2)$	$(x^2 + x + 4)(x^2 + 5x - 3)$	$(x^2 + 5x - 3)(x^2 + 2x - 1)$

$$\begin{aligned}
&(x^2 + 5x - 2)(x^2 - 4x - 2) \\
&(x^2 + x + 3)(x^2 - 3x + 4) \\
&(x^2 - 5x - 3)(x^2 + 3x - 5) \\
&(x^2 + 3)(x^2 + x - 1) \\
&(x^2 - 4x - 4)(x^2 - 5) \\
&(x^2 + 5x - 4)(x^2 + x + 5) \\
&(x^2 + 2x + 3)(x^2 - 5x + 3) \\
&(x^2 - x - 5)(x^2 + 3x + 1) \\
&(x^2 + x - 5)(x^2 - 3x - 2) \\
&(x^2 - 3x + 1)(x^2 - 5x + 5) \\
&(x^2 - 5x + 3)(x^2 + 5x + 3) \\
&(x^2 + 4)(x^2 - 2x + 5) \\
&(x^2 - 3x + 5)(x^2 + 2) \\
&(x^2 - x + 1)(x^2 + 2x - 5) \\
&(x^2 + 2x - 5)(x^2 - 5x + 1) \\
&(x^2 + 2x + 4)(x^2 - 3x - 1) \\
&(x^2 - 4x - 2)(x^2 + 2x + 4) \\
&(x^2 + 2x - 2)(x^2 - 5x + 3) \\
&(x^2 - 4x + 2)(x^2 + x + 1) \\
&(x^2 + 4x - 3)(x^2 - x - 4) \\
&(x^2 + 3)(x^2 + 3x + 5) \\
&(x^2 + 3x - 5)(x^2 - 4x - 4) \\
&(x^2 + x - 4)(x^2 + x - 3) \\
&(x^2 + 4x - 3)(x^2 - x + 2) \\
&(x^2 - 4x + 1)(x^2 - x - 1) \\
&(x^2 + x + 5)(x^2 - 4x - 3)
\end{aligned}$$

$$\begin{aligned}
&(x^2 + 5x - 5)(x^2 + 3x + 1) \\
&(x^2 - x - 4)(x^2 + 4) \\
&(x^2 + 1)(x^2 + 4x - 4) \\
&(x^2 - 4x - 1)(x^2 + 4x - 1) \\
&(x^2 - x - 1)(x^2 + 4x - 4) \\
&(x^2 - 5x + 5)(x^2 - 5x - 2) \\
&(x^2 + 5x + 3)(x^2 + x - 1) \\
&(x^2 + 5x + 5)(x^2 + 4) \\
&(x^2 - 2x + 4)(x^2 - 3x - 3) \\
&(x^2 + 3x - 2)(x^2 + 2x + 3) \\
&(x^2 + 3x + 3)(x^2 + 4x + 5) \\
&(x^2 - 5x + 3)(x^2 - 2) \\
&(x^2 + 2x + 3)(x^2 + 5x - 5) \\
&(x^2 + x + 3)(x^2 + x + 3) \\
&(x^2 - 3x - 2)(x^2 - x - 4) \\
&(x^2 + 4x - 4)(x^2 + 2x + 4) \\
&(x^2 - x + 1)(x^2 - 2x - 1) \\
&(x^2 - 4x - 4)(x^2 + x + 1) \\
&(x^2 - 4x - 1)(x^2 - x - 5) \\
&(x^2 - x + 5)(x^2 - 3x + 5) \\
&(x^2 + 2x + 3)(x^2 - x + 2) \\
&(x^2 + 5)(x^2 - 5x + 5) \\
&(x^2 - 5x - 1)(x^2 + 5x - 5) \\
&(x^2 - 5x - 3)(x^2 - 3x - 2) \\
&(x^2 + 2x + 3)(x^2 - 2x + 3) \\
&(x^2 + 5x - 3)(x^2 + 4x - 2)
\end{aligned}$$

$$\begin{aligned}
&(x^2 + 4x + 5)(x^2 - 2) \\
&(x^2 - x - 1)(x^2 - 2x + 5) \\
&(x^2 + 5x - 1)(x^2 - 5x - 4) \\
&(x^2 - 3x - 2)(x^2 - 2x - 1) \\
&(x^2 - 3x + 3)(x^2 - 3x - 2) \\
&(x^2 + 2x - 1)(x^2 - 2x + 2) \\
&(x^2 - 3x + 1)(x^2 - 3x - 3) \\
&(x^2 + x + 5)(x^2 - 5x - 4) \\
&(x^2 + 1)(x^2 - 3x + 5) \\
&(x^2 - 3x + 4)(x^2 - 5x - 1) \\
&(x^2 - x + 2)(x^2 - 5x - 4) \\
&(x^2 + 3x - 1)(x^2 - 4x + 1) \\
&(x^2 + 2x + 2)(x^2 - 5x - 4) \\
&(x^2 - x + 4)(x^2 + x + 1) \\
&(x^2 - x + 5)(x^2 + 2x + 5) \\
&(x^2 + x - 4)(x^2 + 3x - 3) \\
&(x^2 - 3x + 4)(x^2 - 2x + 3) \\
&(x^2 - x - 1)(x^2 - 4x - 2) \\
&(x^2 + 4x - 1)(x^2 - 2x + 2) \\
&(x^2 + 2x + 3)(x^2 - 5x - 5) \\
&(x^2 - 3x - 3)(x^2 - x + 3) \\
&(x^2 - 3x + 4)(x^2 - 4x - 4) \\
&(x^2 - 3x - 3)(x^2 - 3x + 4) \\
&(x^2 + 4x + 5)(x^2 + x - 1) \\
&(x^2 - x + 1)(x^2 + 3x + 1) \\
&(x^2 - x + 5)(x^2 + 3x + 3)
\end{aligned}$$

## 5.2 일계수가 아닌 사차식

$$\begin{aligned}
&(5x^2 + 4x + 1)(5x^2 - 2x + 3) \\
&(2x^2 + 5x - 2)(3x^2 + 4x - 5) \\
&(3x^2 - 2x + 1)(2x^2 - x + 3) \\
&(2x^2 + x + 5)(x^2 + 3x + 3) \\
&(5x^2 + 4x + 5)(x^2 + 5x + 5) \\
&(5x^2 + 4x + 3)(5x^2 + 4x - 5) \\
&(x^2 + x + 4)(5x^2 + 5x + 2) \\
&(5x^2 + 2x + 3)(4x^2 - 4x - 1) \\
&(3x^2 - 5)(5x^2 + 2x + 4) \\
&(4x^2 + 5x + 5)(4x^2 + 3x - 3) \\
&(3x^2 - 5x + 1)(5x^2 + 2) \\
&(x^2 - 3x + 4)(4x^2 + x - 4) \\
&(x^2 + 2)(2x^2 - x + 1) \\
&(5x^2 - 3x + 4)(2x^2 + 1) \\
&(3x^2 - x + 2)(x^2 + 2x + 5) \\
&(5x^2 - 3x + 5)(3x^2 - 4) \\
&(x^2 + 4x - 2)(5x^2 + x + 2) \\
&(3x^2 + x + 1)(5x^2 - 2x - 2)
\end{aligned}$$

$$\begin{aligned}
&(2x^2 - x + 2)(4x^2 - 5x + 2) \\
&(3x^2 - 2x + 1)(3x^2 - 4x - 1) \\
&(4x^2 - 3x + 4)(4x^2 + 3x + 3) \\
&(3x^2 - 2x + 1)(5x^2 - 2x - 1) \\
&(2x^2 - 5)(5x^2 + 1) \\
&(5x^2 - 5x - 3)(x^2 + 3x - 3) \\
&(5x^2 + 2)(5x^2 + 3x + 2) \\
&(2x^2 - 3x + 3)(x^2 - 2x + 5) \\
&(3x^2 - 2x - 3)(3x^2 - 4x + 2) \\
&(5x^2 - 4x - 4)(x^2 - x - 1) \\
&(3x^2 + 5x - 1)(2x^2 - 4x + 5) \\
&(4x^2 + x + 3)(2x^2 + x + 2) \\
&(2x^2 - 5x + 4)(x^2 + 3x - 3) \\
&(5x^2 + x + 5)(5x^2 - 2x - 1) \\
&(4x^2 + 5x - 1)(2x^2 - x - 5) \\
&(3x^2 + 2x + 3)(5x^2 - 4x - 4) \\
&(4x^2 - x - 1)(5x^2 - 3x + 3) \\
&(2x^2 + 4x + 1)(4x^2 - 5x - 1)
\end{aligned}$$

$$\begin{aligned}
&(5x^2 + x - 5)(2x^2 + x + 4) \\
&(x^2 + 5x + 2)(2x^2 - x + 3) \\
&(5x^2 + x + 5)(x^2 - 2x - 1) \\
&(5x^2 + x - 1)(4x^2 - 3x + 1) \\
&(4x^2 - x - 1)(2x^2 + 4x + 1) \\
&(4x^2 + 2x + 3)(3x^2 + 2x + 4) \\
&(5x^2 - 5x + 1)(3x^2 + 4x - 2) \\
&(5x^2 + 3x - 3)(5x^2 + 3x + 1) \\
&(2x^2 - 3x - 1)(5x^2 - 3x + 3) \\
&(x^2 - 3x + 3)(4x^2 - 3x + 5) \\
&(4x^2 - 3)(4x^2 + 5x - 5) \\
&(3x^2 - x - 3)(4x^2 - 5x - 3) \\
&(3x^2 + 4x + 5)(3x^2 - x + 4) \\
&(x^2 + 2x + 5)(3x^2 + 2x + 1) \\
&(x^2 + 4x + 5)(3x^2 - x - 5) \\
&(5x^2 + 5x + 1)(4x^2 + 5x - 1) \\
&(3x^2 + x - 5)(2x^2 - 5) \\
&(x^2 - 2x - 5)(4x^2 + x - 2)
\end{aligned}$$

$$\begin{array}{lll}
(3x^2 - 3x - 5)(4x^2 + 4x - 5) & (5x^2 - 5x + 2)(5x^2 + x + 1) & (4x^2 - x - 1)(x^2 + 2x - 4) \\
(2x^2 - 5x + 1)(3x^2 - 4x + 4) & (3x^2 + x + 3)(x^2 + 4x + 2) & (4x^2 - 5x + 2)(x^2 - 3x - 3) \\
(3x^2 + 2)(x^2 + 5x - 3) & (4x^2 + x + 2)(5x^2 - x + 5) & (3x^2 - x + 3)(x^2 - x - 3) \\
(3x^2 + 4x + 2)(5x^2 - 4x + 2) & (5x^2 + 4x - 3)(4x^2 - 2x + 5) & (3x^2 + 4x + 3)(5x^2 - 4x + 1) \\
(2x^2 + 5x - 1)(3x^2 + 4x - 2) & (5x^2 - 2x + 5)(4x^2 - 4x - 5) & (5x^2 + 3x - 5)(x^2 - 4x - 2) \\
(2x^2 - 2x - 1)(3x^2 + x + 3) & (3x^2 - 5x - 3)(2x^2 + 3x - 4) & (2x^2 - 2x + 3)(5x^2 - 5x - 3) \\
(5x^2 + 4x + 2)(x^2 - x + 5) & (2x^2 + 2x + 5)(5x^2 + 2x + 3) & (5x^2 + 4x - 3)(2x^2 + 4x + 3) \\
(5x^2 - 5x - 3)(5x^2 - x + 2) & (2x^2 - 3x - 1)(3x^2 + 4x - 5) & (3x^2 - 4x - 5)(3x^2 - 3x - 2) \\
(x^2 - 2)(2x^2 + 5x + 5) & (2x^2 - 4x + 3)(5x^2 - 5x + 2) & (4x^2 + 5x - 2)(4x^2 - 5x + 3) \\
(3x^2 - 4x - 5)(x^2 - x - 3) & (3x^2 - 5x + 3)(2x^2 + 4x + 5) & (5x^2 - 4x + 1)(2x^2 - x + 3) \\
(3x^2 - x + 2)(3x^2 + x + 4) & (2x^2 + 3x - 1)(3x^2 - 5x - 3) & (x^2 + x + 4)(2x^2 + 2x - 5) \\
(3x^2 - x + 1)(5x^2 - x - 3) & (2x^2 - 4x - 3)(5x^2 - 5x + 2) & (4x^2 + 2x + 5)(3x^2 - 2x + 4) \\
(x^2 - 2x - 5)(2x^2 - 4x - 3) & (5x^2 + 4x + 1)(3x^2 + 2) & (2x^2 - x + 5)(3x^2 + x + 5) \\
(4x^2 + 5x - 2)(4x^2 + 2x + 3) & (2x^2 - 5x - 2)(4x^2 + 2x - 5) & (3x^2 + x - 3)(4x^2 + 3x - 4) \\
(5x^2 - 3x + 2)(5x^2 + 2x - 1) & (4x^2 + 3x + 2)(2x^2 + 3x + 5) & (5x^2 + 3x - 1)(5x^2 - 2x - 2) \\
(5x^2 + 3x + 1)(x^2 - 5x + 5) & (x^2 + 5x + 1)(2x^2 + 4x + 1) & (4x^2 + 4x + 3)(x^2 + 5x - 1) \\
(5x^2 - 3x - 4)(3x^2 + x + 4) & (x^2 - x - 4)(3x^2 + 5x - 4) & (5x^2 - 3x + 3)(5x^2 + 2x + 4) \\
(x^2 - x + 3)(5x^2 - 2x + 4) & (3x^2 - 2x + 1)(3x^2 - 2x - 2) & (2x^2 + 5x - 5)(2x^2 - 2x - 5) \\
(5x^2 - x - 3)(2x^2 - 5x - 2) & (5x^2 + 5x + 2)(5x^2 + 3x + 5) & (5x^2 - 2x + 1)(4x^2 - 4x - 1) \\
(5x^2 + 4x + 3)(3x^2 - 2x + 5) & (5x^2 + 3x - 4)(3x^2 + 5x + 4) & (3x^2 - 5x + 1)(3x^2 + 4) \\
(5x^2 - x + 5)(2x^2 - 2x - 3) & (2x^2 - 4x + 1)(4x^2 - 5x - 3) & (3x^2 + 4)(5x^2 - x - 2) \\
(3x^2 - 2x + 1)(x^2 + 4x + 2) & (4x^2 - 5x - 1)(4x^2 - 5x - 5) & (3x^2 + 2x + 5)(4x^2 + 4x + 3) \\
(2x^2 + 3x - 4)(4x^2 + 3x + 1) & (x^2 + 5x - 5)(4x^2 + 4x + 3) & (4x^2 + x - 2)(5x^2 - 4x - 3) \\
(5x^2 + 3x - 4)(x^2 + x + 1) & (2x^2 + x + 2)(x^2 + 3) & (5x^2 - x + 4)(3x^2 - 2x + 4) \\
(4x^2 + 5x - 2)(x^2 - 5x - 4) & (x^2 + 2x - 5)(5x^2 + 5x + 2) & (4x^2 - 5x - 4)(3x^2 - 2x - 2) \\
(5x^2 - 2x + 4)(4x^2 + 3x + 4) & (5x^2 - 4x - 2)(x^2 + x + 2) & (4x^2 - 3x - 3)(5x^2 + 5x + 4) \\
(x^2 + 3x - 2)(2x^2 + 3x - 1) & (3x^2 - x + 2)(5x^2 + 3) & (2x^2 + 3x - 3)(2x^2 - 5x + 1) \\
(4x^2 - 3x - 4)(3x^2 + 4x + 4) & (3x^2 - 5x - 3)(4x^2 + 5x + 4) & (x^2 + 5x - 2)(4x^2 - 5x - 2) \\
(5x^2 + 4x + 4)(5x^2 - 3x - 3) & (x^2 - x - 1)(5x^2 - 4x - 5) & (4x^2 - 5x - 2)(5x^2 + 5x - 3) \\
(x^2 + 4x - 3)(4x^2 - 3x + 2) & (x^2 - 5x + 2)(5x^2 - 3x - 1) & (5x^2 + 3x - 1)(x^2 - 2x + 4) \\
(2x^2 + 1)(5x^2 + x + 3) & (2x^2 + 5x - 2)(5x^2 + 5x - 3) & (5x^2 + x + 3)(2x^2 - x - 5) \\
(2x^2 + 5x + 4)(3x^2 - 3x - 2) & (5x^2 + x + 1)(2x^2 - x - 2) & (4x^2 + 5x - 5)(x^2 - x - 1) \\
(2x^2 + 5x + 4)(x^2 + x + 1) & (2x^2 + 3x + 3)(2x^2 + 3x + 2) & (3x^2 + x + 3)(3x^2 - 3x + 5) \\
(4x^2 - 2x - 5)(x^2 - 4x + 5) & (2x^2 - x - 4)(x^2 - x + 3) & (5x^2 + 5x - 4)(4x^2 - 3) \\
(3x^2 + 5x + 1)(x^2 + 3x + 3) & (x^2 + 3x - 5)(5x^2 - 4x + 3) & (3x^2 + 4x - 2)(3x^2 + x - 1) \\
(5x^2 + x + 3)(x^2 + 5x - 3) & (x^2 - 5x + 2)(5x^2 + 5x + 3) & (3x^2 + 5x + 4)(5x^2 + 3x - 5) \\
(5x^2 + 3x - 5)(5x^2 - x + 2) & (3x^2 - 1)(2x^2 - 3) & (5x^2 + 3x - 5)(3x^2 + 5x + 1) \\
(4x^2 - 5x + 3)(5x^2 - 3x - 3) & (x^2 + 3x - 1)(3x^2 - 5x + 1) & (5x^2 + 5x + 4)(5x^2 + 2x - 5) \\
(3x^2 - 5x + 4)(4x^2 - x - 4) & (4x^2 - 2x - 5)(x^2 - 3x + 4) & (4x^2 - 5x + 3)(2x^2 - x + 2) \\
(x^2 + 4x - 1)(4x^2 - x + 5) & (5x^2 + 3x + 4)(3x^2 + 5x + 1) & (2x^2 + 5)(3x^2 - 5x + 4) \\
(2x^2 - x + 5)(3x^2 + 3x + 2) & (5x^2 - 3)(3x^2 - 3x + 4) & (3x^2 - x - 3)(2x^2 - 5x + 5) \\
(2x^2 - 5x - 4)(x^2 - 4x - 2) & (3x^2 - 2x - 2)(2x^2 - 3) & (x^2 + 4x - 4)(3x^2 - 4x + 3)
\end{array}$$

## 6. 오차식의 인수분해

### 6.1 일계수 오차식

$(x^2 - 4x + 2)(x^3 - x - 2)$	$(x^2 - 3x - 5)(x^3 - 3x^2 + 3x - 3)$	$(x^2 - 4x - 2)(x^3 - 3x - 5)$
$(x^2 - 3x + 1)(x^3 + 2x + 2)$	$(x^2 - 2x - 2)(x^3 - 5x^2 - x + 3)$	$(x^2 + x + 3)(x^3 + 2x^2 - 4x + 3)$
$(x^2 + 2x + 2)(x^3 - 4x^2 + 3x - 1)$	$(x^2 + 4x - 4)(x^3 + 2x - 5)$	$(x^2 - 4x - 3)(x^3 - 2x^2 - 5x - 3)$
$(x^2 + 4x + 1)(x^3 + 2x^2 - 5x - 3)$	$(x^2 - 5x - 4)(x^3 + 2x^2 - 5x + 3)$	$(x^2 - 5x - 5)(x^3 + 2x^2 + 5x + 1)$
$(x^2 - x + 5)(x^3 + 2x^2 - 3x - 2)$	$(x^2 - 2x + 5)(x^3 + 5x^2 - 3)$	$(x^2 + 4x + 2)(x^3 + 2x^2 + 3x + 1)$
$(x^2 + x - 5)(x^3 - x^2 + 2x + 1)$	$(x^2 + 5x + 1)(x^3 - 3x^2 + 5x - 5)$	$(x^2 - 2x + 4)(x^3 - 2x^2 + 5)$
$(x^2 - x + 2)(x^3 + 2x^2 - 3x - 2)$	$(x^2 - 5x - 5)(x^3 + 3x^2 - 5x + 3)$	$(x^2 - 2x - 5)(x^3 - x - 4)$
$(x^2 - 2)(x^3 + x^2 + 2x + 3)$	$(x^2 - 5x - 4)(x^3 + x^2 + 5x - 4)$	$(x^2 - 5x - 5)(x^3 - 3x^2 - x + 1)$
$(x^2 - 4x - 4)(x^3 + 5x^2 - 5x + 1)$	$(x^2 - x - 5)(x^3 - 5x^2 + 5)$	$(x^2 + 5x + 1)(x^3 - 5x^2 - 3)$
$(x^2 + x - 4)(x^3 + x^2 - 4x - 1)$	$(x^2 + x - 1)(x^3 + 3x^2 - x + 3)$	$(x^2 + 5x - 5)(x^3 + 3x^2 + 2x - 3)$
$(x^2 + 2x - 1)(x^3 + 4x^2 + 5x + 3)$	$(x^2 + 4x - 1)(x^3 - x^2 - 5x + 3)$	$(x^2 + 3x + 1)(x^3 + 5x^2 - 2x - 2)$
$(x^2 + 3x - 1)(x^3 + 3x^2 - 2x - 1)$	$(x^2 + 5x - 4)(x^3 + 2x^2 - 3x + 2)$	$(x^2 + 3x - 1)(x^3 - 5x^2 - 2x - 3)$
$(x^2 - 5x - 3)(x^3 + x^2 + x + 3)$	$(x^2 + 3)(x^3 - 2x^2 + 2x - 2)$	$(x^2 + 5x - 1)(x^3 + 2x^2 + 2x + 5)$
$(x^2 + 2x + 4)(x^3 - 5x^2 + x + 1)$	$(x^2 + x - 5)(x^3 - 3x^2 + 2x + 2)$	$(x^2 + 3x - 5)(x^3 + 4x^2 + x + 2)$
$(x^2 - 5)(x^3 - 5x^2 + 5x - 2)$	$(x^2 + 4x - 1)(x^3 + 4x^2 + 5x + 3)$	$(x^2 - 2)(x^3 + 2x^2 - x - 1)$
$(x^2 + x + 3)(x^3 - 3x^2 - 2x - 5)$	$(x^2 + 3x + 4)(x^3 - 4x^2 + 5x - 3)$	$(x^2 - 5x + 2)(x^3 + x^2 - 2x + 2)$
$(x^2 + x + 4)(x^3 - 4x^2 + 2x - 1)$	$(x^2 + x + 4)(x^3 + 3x^2 - 3x + 2)$	$(x^2 - 4x - 3)(x^3 + 3x^2 - 3x - 4)$
$(x^2 - x + 2)(x^3 - 4x^2 - 5x - 3)$	$(x^2 + 5x - 2)(x^3 + 2x^2 + x - 3)$	$(x^2 - 3)(x^3 + 4x^2 + 3x + 2)$
$(x^2 + 4x + 2)(x^3 + 4x + 3)$	$(x^2 - 2x + 2)(x^3 + 5x^2 - x + 2)$	$(x^2 - 3x - 1)(x^3 + 5x^2 - 2x + 1)$
$(x^2 + 5x + 2)(x^3 - 5x^2 - x - 5)$	$(x^2 + x + 3)(x^3 - 5x^2 + 4x + 5)$	$(x^2 - 5x - 5)(x^3 - 5x^2 + 3x - 2)$
$(x^2 + 3x - 1)(x^3 + 5x^2 - 3x + 4)$	$(x^2 + 2x + 2)(x^3 + 4x^2 + 5x - 5)$	$(x^2 + 2x + 4)(x^3 + 3x^2 + x + 1)$
$(x^2 + 5x - 1)(x^3 + 2x^2 - 2x + 4)$	$(x^2 - 4x + 2)(x^3 - 3x^2 + 2x - 2)$	$(x^2 - 3x - 2)(x^3 - 2x^2 + 4x - 5)$
$(x^2 + x + 4)(x^3 - 4x^2 - 3x + 4)$	$(x^2 + x - 4)(x^3 - 5x + 1)$	$(x^2 + 3x - 5)(x^3 + 5x^2 - 4x + 5)$
$(x^2 - x + 1)(x^3 - 3x^2 + 4x - 3)$	$(x^2 + 5x - 5)(x^3 - 3x^2 - 4x - 1)$	$(x^2 + 2x - 1)(x^3 - 2x^2 - 3)$
$(x^2 - 2x + 2)(x^3 - x^2 - 2x + 1)$	$(x^2 - x + 4)(x^3 - 4x^2 - 4x + 2)$	$(x^2 - 3x + 3)(x^3 + x^2 + 5x - 5)$
$(x^2 - 4x - 1)(x^3 - 5x^2 + 5x - 5)$	$(x^2 + 3x - 5)(x^3 + 5x + 3)$	$(x^2 + 5x + 3)(x^3 + 5x^2 - 4x - 4)$
$(x^2 + x + 2)(x^3 - 4x^2 - 2x - 5)$	$(x^2 + x - 5)(x^3 - x^2 + 4x - 5)$	$(x^2 - 3x + 5)(x^3 + 2x^2 - 4x - 1)$
$(x^2 + x - 5)(x^3 - 4x - 2)$	$(x^2 - 2x + 4)(x^3 - 3x^2 - 5)$	$(x^2 + 2x - 4)(x^3 - 3x^2 + 2x + 4)$
$(x^2 + 5x - 4)(x^3 - 5x^2 + x - 4)$	$(x^2 + 5x - 5)(x^3 - 4x^2 + 4x + 5)$	$(x^2 + 5x + 5)(x^3 + 2x^2 - x + 2)$
$(x^2 + 2x + 4)(x^3 - 2x^2 + x + 3)$	$(x^2 + 3x + 3)(x^3 - 5x^2 + 4x - 5)$	$(x^2 - 3x + 3)(x^3 + x^2 + 4x - 5)$
$(x^2 + 2x + 5)(x^3 + 5x^2 - 5x - 3)$	$(x^2 + 5x - 4)(x^3 - 2x^2 + 4x + 1)$	$(x^2 + 4x + 5)(x^3 + 5x^2 + 3x + 3)$
$(x^2 + 5)(x^3 + 2x^2 - 5x - 1)$	$(x^2 + 2x - 5)(x^3 + x^2 - 2x - 4)$	$(x^2 + x - 1)(x^3 + x^2 + 4x + 2)$
$(x^2 + x - 1)(x^3 - 2x - 5)$	$(x^2 - 5x - 4)(x^3 + 5x^2 - 4x + 5)$	$(x^2 - x - 4)(x^3 + x^2 - x + 1)$
$(x^2 + 5x - 2)(x^3 + 2x^2 - 3x - 5)$	$(x^2 - x - 5)(x^3 + 3x^2 - x - 2)$	$(x^2 + 4x - 4)(x^3 + 2x^2 - 2)$

$$\begin{aligned}
&(x^2 - 4x + 1)(x^3 + 2x^2 + 4x + 5) \\
&(x^2 + 5x - 5)(x^3 + x^2 - 5x + 2) \\
&(x^2 + x - 1)(x^3 + 5x^2 - 5x - 4) \\
&(x^2 - 5x + 1)(x^3 + x^2 - 3x - 5) \\
&(x^2 + 2x - 2)(x^3 - 5x^2 + 1) \\
&(x^2 - x + 4)(x^3 - x^2 + x + 4) \\
&(x^2 - 2x + 3)(x^3 - x^2 + x - 4) \\
&(x^2 + 5x - 3)(x^3 + x^2 + 5x + 2) \\
&(x^2 - x - 1)(x^3 - x + 4) \\
&(x^2 - x + 3)(x^3 - 3x^2 - 3) \\
&(x^2 + 3x - 1)(x^3 - x^2 - 3) \\
&(x^2 - x + 5)(x^3 - 3x^2 - 2x - 2) \\
&(x^2 + 5x + 2)(x^3 + 3x + 5) \\
&(x^2 + x - 5)(x^3 - 5x^2 - x - 4) \\
&(x^2 - 3x + 5)(x^3 - 2x^2 + x - 3) \\
&(x^2 - 5x - 3)(x^3 + 4x^2 - 4x - 5) \\
&(x^2 + 3)(x^3 - 4x^2 + 4x - 2) \\
&(x^2 + 5x - 2)(x^3 - x^2 - 4x - 1) \\
&(x^2 + 4x + 5)(x^3 - 5x^2 + 4x - 1) \\
&(x^2 - 5x - 3)(x^3 - x^2 - 5x + 3) \\
&(x^2 + x + 4)(x^3 + 2x^2 - 4x + 3) \\
&(x^2 - 2x + 5)(x^3 + 4x^2 + 3x + 3) \\
&(x^2 - x + 1)(x^3 + 3x^2 - 4x + 2) \\
&(x^2 + x - 5)(x^3 - 5x^2 - 4x - 5) \\
&(x^2 + x + 2)(x^3 - x^2 - 4x + 2) \\
&(x^2 - 4x - 2)(x^3 + 5x^2 - x - 4)
\end{aligned}$$

$$\begin{aligned}
&(x^2 + 3x - 2)(x^3 - 5x^2 - 4x + 3) \\
&(x^2 - x + 4)(x^3 - 5x^2 + 5x - 5) \\
&(x^2 + 3x - 5)(x^3 - 2x^2 + 2x + 3) \\
&(x^2 - 3)(x^3 + 5x^2 - 2x + 4) \\
&(x^2 + 2x + 4)(x^3 - 5x^2 - 4x - 1) \\
&(x^2 - 2x - 5)(x^3 + 5x^2 + 3x + 2) \\
&(x^2 + 5x + 1)(x^3 - 4x^2 - x - 5) \\
&(x^2 + 5x - 1)(x^3 - 5x^2 + 2x + 5) \\
&(x^2 - 3)(x^3 - 4x^2 - 5x - 1) \\
&(x^2 - 4x - 2)(x^3 + 2x - 5) \\
&(x^2 - 5x - 1)(x^3 - x^2 - 3x + 4) \\
&(x^2 - x - 1)(x^3 - 5x^2 - x - 5) \\
&(x^2 + x + 2)(x^3 - 2x^2 + 2x - 5) \\
&(x^2 + x + 2)(x^3 - 4x^2 + 3x - 2) \\
&(x^2 + x + 3)(x^3 + 3x^2 - 2x + 3) \\
&(x^2 - x + 2)(x^3 + 3x^2 - 3x + 3) \\
&(x^2 + 1)(x^3 - 2x^2 - 3x - 2) \\
&(x^2 - x + 2)(x^3 - x^2 - 4x - 1) \\
&(x^2 + 3x + 5)(x^3 + x - 1) \\
&(x^2 + 2x - 5)(x^3 - 3x^2 - 2x + 1) \\
&(x^2 + x + 2)(x^3 - 3x^2 - 4x + 2) \\
&(x^2 + x - 4)(x^3 - 5x^2 - 2x - 5) \\
&(x^2 - 2)(x^3 + 4x^2 + 3x + 2) \\
&(x^2 - x - 3)(x^3 + 5x^2 + x + 4) \\
&(x^2 - 5x - 5)(x^3 + x^2 - 4x - 2) \\
&(x^2 + x - 4)(x^3 - x^2 - 3x - 3)
\end{aligned}$$

$$\begin{aligned}
&(x^2 - 4x - 4)(x^3 + 4x^2 - 2x + 5) \\
&(x^2 - 4x + 5)(x^3 + 5x^2 - 3x - 2) \\
&(x^2 + x - 1)(x^3 - 5x^2 + 2x - 1) \\
&(x^2 - 4x - 4)(x^3 - 3x^2 - 2x - 1) \\
&(x^2 - 3x + 4)(x^3 + 4x^2 + 3x + 1) \\
&(x^2 + 5x + 3)(x^3 - 2x^2 + 3x + 4) \\
&(x^2 + x - 5)(x^3 + 5x + 1) \\
&(x^2 - 2)(x^3 + 5x^2 - 2x + 5) \\
&(x^2 - 4x - 4)(x^3 + 3x - 3) \\
&(x^2 + 3x + 5)(x^3 + x^2 + 3x + 1) \\
&(x^2 + 4)(x^3 + 4x + 4) \\
&(x^2 + 4x + 2)(x^3 - x^2 - 3x - 4) \\
&(x^2 - 2x + 4)(x^3 + 4x^2 - 3x + 5) \\
&(x^2 + 3x + 1)(x^3 + 4x^2 + 4x + 2) \\
&(x^2 + 5x - 4)(x^3 - 3x + 1) \\
&(x^2 - 3x + 5)(x^3 - 4x^2 + 2x + 5) \\
&(x^2 - x - 5)(x^3 - 2x^2 + 3x + 3) \\
&(x^2 - 3)(x^3 - 5x^2 - 2x - 2) \\
&(x^2 - 5x - 5)(x^3 + 3x^2 - 3x - 3) \\
&(x^2 - 3x - 2)(x^3 - 4x^2 + 2x - 1) \\
&(x^2 - 2x - 1)(x^3 - 4x^2 - 3x - 1) \\
&(x^2 + 2x - 2)(x^3 - 2x^2 - 5x + 2) \\
&(x^2 + 2x - 2)(x^3 + 4x^2 - 4x + 1) \\
&(x^2 + 3x - 1)(x^3 - 4x^2 - 5x + 4) \\
&(x^2 - 3x + 1)(x^3 - 3x^2 - 5x - 3) \\
&(x^2 - 3x - 5)(x^3 + 5x^2 - 5x - 5)
\end{aligned}$$

## 6.2 일계수가 아닌 오차식

$$\begin{aligned}
&(2x^2 + 3x - 1)(4x^3 + 5x^2 + 4x + 1) \\
&(5x^2 + 3x - 5)(4x^3 - x^2 + 2x + 2) \\
&(5x^2 - 4x - 5)(5x^3 - x^2 - 2x + 1) \\
&(3x^2 + 5x + 3)(x^3 - 3x^2 - 4x + 5) \\
&(5x^2 + 5x + 1)(4x^3 + x^2 - 4x - 2) \\
&(5x^2 + 5x - 3)(3x^3 - 5x^2 - 3x + 4) \\
&(4x^2 - 3x + 1)(x^3 - 4x^2 - 3x - 3) \\
&(2x^2 + x + 1)(4x^3 - 2x^2 + 5x - 4) \\
&(3x^2 + 5x + 5)(2x^3 - 3x^2 - 5x - 2) \\
&(2x^2 - 2x - 1)(x^3 - x + 2) \\
&(4x^2 + 3)(5x^3 + x^2 + 3x + 5) \\
&(x^2 - 5x + 3)(2x^3 - 2x^2 + 2x + 1) \\
&(3x^2 + 4x - 3)(5x^3 - 5x^2 - 2) \\
&(2x^2 + 3x + 2)(2x^3 + 5x + 4) \\
&(4x^2 + 2x - 5)(5x^3 - 2x^2 - 4x - 5) \\
&(4x^2 + 3x + 3)(3x^3 + 5x^2 - 4x - 5) \\
&(3x^2 + 5x + 3)(5x^3 + 5x^2 + 5x - 2) \\
&(4x^2 - 5x + 2)(3x^3 - 3x^2 - x - 1)
\end{aligned}$$

$$\begin{aligned}
&(4x^2 + 3x - 3)(3x^3 - x^2 + x - 5) \\
&(4x^2 - 4x - 1)(x^3 - 2x^2 - 3x + 5) \\
&(5x^2 - 4x - 5)(x^3 + 5x^2 - 4x + 5) \\
&(x^2 - 5x + 5)(3x^3 - x^2 + 3x + 2) \\
&(4x^2 + 2x - 3)(4x^3 - 2x^2 - 5x + 2) \\
&(5x^2 + 3x - 4)(5x^3 + 3x^2 + 2x + 2) \\
&(3x^2 - x + 2)(2x^3 - 5x^2 - 2x - 5) \\
&(3x^2 - 4x - 2)(x^3 + x^2 - 2x - 3) \\
&(3x^2 + 5x - 4)(2x^3 - 5x^2 + 2x - 4) \\
&(2x^2 - 2x - 3)(4x^3 + 3x^2 - 2x - 4) \\
&(3x^2 + 3x - 1)(x^3 - 5x^2 + 4x - 3) \\
&(4x^2 + x - 1)(3x^3 - 4x - 3) \\
&(3x^2 + x - 3)(4x^3 + 3x^2 - 5x - 3) \\
&(4x^2 + 3x - 5)(5x^3 + 4x^2 - 2x + 5) \\
&(3x^2 + 2x + 3)(x^3 - 3x^2 - 5x - 2) \\
&(3x^2 + 2x + 2)(2x^3 + 5x^2 + x + 3) \\
&(x^2 + x + 4)(2x^3 + 3x^2 + x - 1) \\
&(5x^2 - 4x - 2)(5x^3 - x^2 + 4x - 5)
\end{aligned}$$

$$\begin{aligned}
&(x^2 - 3x + 1)(5x^3 - x^2 + 2x - 5) \\
&(5x^2 - x - 5)(4x^3 - 4x^2 - 2x + 3) \\
&(2x^2 + 5)(2x^3 - x^2 + x - 4) \\
&(3x^2 + 2)(4x^3 + 4x^2 - x - 5) \\
&(5x^2 + 4x - 3)(2x^3 + 2x^2 + 3x + 5) \\
&(3x^2 - 5x + 5)(2x^3 + 4x^2 + 2x - 5) \\
&(3x^2 + 2)(x^3 - 5x^2 - 2x + 5) \\
&(3x^2 + 5x - 1)(3x^3 + 2x^2 - 2) \\
&(x^2 + 5)(5x^3 + 5x^2 - x - 4) \\
&(3x^2 + 3x + 4)(5x^3 - x^2 - x - 1) \\
&(4x^2 - 4x - 1)(2x^3 + 2x^2 - 5x + 4) \\
&(5x^2 + 4x + 4)(5x^3 - 3x^2 + 4x - 4) \\
&(3x^2 - x + 2)(2x^3 - 2x^2 + 3x + 2) \\
&(5x^2 + x - 3)(3x^3 - x^2 + 5x - 1) \\
&(2x^2 - x + 5)(3x^3 - 5) \\
&(4x^2 + 5x - 4)(3x^3 - x^2 - 4) \\
&(x^2 + 2x - 2)(4x^3 - 4x^2 + x + 4) \\
&(4x^2 - 3)(3x^3 + 2x^2 + 4x + 4)
\end{aligned}$$

$$\begin{aligned}
& (2x^2 - 2x + 1)(4x^3 + 5x^2 + 2x - 3) & (3x^2 - 2x + 1)(4x^3 + 3x^2 - x - 1) & (3x^2 + 5x - 5)(2x^3 + 5x^2 - 4x + 4) \\
& (5x^2 - x - 1)(3x^3 + 2x^2 + 3x - 2) & (3x^2 + 2x - 3)(3x^3 - x^2 - 4x - 2) & (x^2 - 5x - 1)(5x^3 - 5x^2 - x - 5) \\
& (x^2 - 3x + 5)(3x^3 - 5x^2 + 4x + 3) & (3x^2 - 1)(5x^3 - 2x^2 - 3x - 3) & (4x^2 - 4x - 5)(4x^3 - 2x^2 + 2x - 5) \\
& (x^2 - 5x - 3)(4x^3 + x^2 + x - 4) & (5x^2 - 4x + 3)(4x^3 + 3x^2 - 5x + 4) & (x^2 - 2x - 2)(2x^3 - 5x^2 - 3x - 5) \\
& (4x^2 + 5x - 5)(2x^3 - x^2 + 5) & (4x^2 - 5x + 4)(x^3 - 4x^2 + 2x - 1) & (x^2 + 5x - 2)(2x^3 + 3x^2 - 2x - 5) \\
& (5x^2 - x + 1)(2x^3 - 2x^2 + 5x + 1) & (4x^2 - 2x - 3)(2x^3 - 3x^2 - 4x - 3) & (3x^2 - 2x + 3)(3x^3 + 2x^2 - 2x + 4) \\
& (5x^2 - 4x - 4)(3x^3 + 5x^2 - 3x + 4) & (3x^2 + 4x - 2)(5x^3 - 3) & (3x^2 - 5x + 4)(4x^3 - 2x^2 + 3x - 1) \\
& (5x^2 - 4x - 5)(5x^3 + x^2 + 4x + 2) & (x^2 + 5x - 4)(3x^3 - x^2 - 2x + 3) & (3x^2 + 5x - 4)(4x^3 - x^2 + 4x - 3) \\
& (2x^2 + x - 2)(3x^3 - 5x^2 - 3x + 4) & (x^2 + 5x + 5)(4x^3 + 5x^2 - 5x + 3) & (x^2 - 2x + 4)(2x^3 + 4x^2 + 2x - 1) \\
& (4x^2 - 5x - 5)(x^3 - 4x^2 - 4x - 1) & (5x^2 - 3x + 1)(x^3 + 2x^2 + 3x + 3) & (3x^2 + 5x + 5)(2x^3 - x^2 + 4x - 4) \\
& (5x^2 - 3x - 5)(5x^3 + 2x^2 - x - 1) & (x^2 + 3)(4x^3 - 3x^2 + 2) & (4x^2 + x - 2)(2x^3 - 3x^2 + 2x + 4) \\
& (2x^2 + 4x - 5)(2x^3 + 5x^2 + x - 4) & (2x^2 + 3x + 4)(5x^3 - 2x + 1) & (2x^2 + x - 5)(4x^3 + x^2 + 5x + 1) \\
& (x^2 - 5x + 5)(3x^3 + 3x^2 - 5x + 3) & (2x^2 - 3x + 2)(5x^3 - x^2 - x - 2) & (5x^2 + x + 5)(4x^3 - 3x^2 - 4x - 1) \\
& (3x^2 - 3x + 5)(x^3 - x^2 - 5x - 4) & (5x^2 + 4x - 3)(5x^3 + x^2 - 2x + 1) & (5x^2 - 2x + 3)(x^3 + 4x^2 - 4x - 4) \\
& (2x^2 + x - 5)(4x^3 - 4x^2 + 3x - 5) & (2x^2 - 4x + 1)(2x^3 + 2x^2 + x - 3) & (5x^2 + 3x + 2)(x^3 + 5x^2 + 2x + 1) \\
& (3x^2 + 4x - 5)(4x^3 - x^2 - 2) & (x^2 - 3x + 4)(3x^3 - 4x^2 + 4x + 2) & (5x^2 + 5x + 2)(x^3 - 5x^2 + 2x + 1) \\
& (2x^2 + 4x + 1)(3x^3 + 2x^2 - 2x - 4) & (x^2 - 3x - 3)(5x^3 - 4x^2 + 3x - 2) & (4x^2 + x - 4)(5x^3 + 4x^2 + 2x - 2) \\
& (4x^2 - 4x + 3)(5x^3 - 3x^2 + 5x - 1) & (x^2 + 2x - 4)(5x^3 - 2x^2 + 5x + 5) & (4x^2 - x + 5)(3x^3 + 5x^2 + 5x + 1) \\
& (5x^2 + 4x + 2)(x^3 - 5x^2 + 3) & (4x^2 - 3x - 4)(x^3 + x^2 - 3x + 5) & (3x^2 - 2x - 4)(x^3 + x^2 + 3x - 2) \\
& (5x^2 - 3)(3x^3 - x^2 + 5x + 1) & (5x^2 - 3x - 1)(2x^3 + 2x^2 + 2x + 1) & (x^2 + 5x + 5)(3x^3 - x^2 + 5x + 4) \\
& (5x^2 + 4x + 3)(5x^3 + 5x^2 - x + 2) & (4x^2 - 3x - 5)(4x^3 + x - 2) & (5x^2 - 4x - 2)(2x^3 + 2x^2 - 5x + 3) \\
& (3x^2 + 4x + 3)(3x^3 - 4x^2 - 2) & (5x^2 + 5x + 3)(5x^3 - x^2 + 4x + 4) & (3x^2 - x + 4)(5x^3 - 5x^2 + x + 2) \\
& (5x^2 + 4x + 2)(x^3 + 4x^2 - 2x + 4) & (3x^2 - 5x - 1)(x^3 + x^2 + x - 1) & (2x^2 - x + 5)(2x^3 - 4x^2 - 3x - 4) \\
& (4x^2 - 5x + 2)(2x^3 + 4x^2 + 5x - 5) & (3x^2 + x - 5)(4x^3 + 3x^2 - 3x + 5) & (5x^2 + x + 3)(2x^3 - x - 2) \\
& (2x^2 + 1)(2x^3 + 2x^2 - 3x - 2) & (3x^2 - x + 1)(4x^3 - x^2 - 2x - 3) & (4x^2 - x + 5)(4x^3 + 4x^2 + 2x - 1) \\
& (5x^2 + 3)(3x^3 - 4x^2 + 3x + 3) & (2x^2 - 2x + 5)(x^3 + x - 5) & (x^2 - 5x - 2)(4x^3 + 2x^2 + 5x - 1) \\
& (4x^2 - 3x + 5)(5x^3 + 2x^2 - 2x - 4) & (2x^2 + 5x - 1)(4x^3 - x^2 + 5x - 1) & (5x^2 + 5x - 3)(4x^3 - x^2 - 3x + 4) \\
& (5x^2 - 2x - 2)(3x^3 - 2x^2 - 3x + 3) & (5x^2 - 3x - 3)(4x^3 - 4x^2 + 5x + 2) & (5x^2 + x + 5)(3x^3 - 2x^2 + 3x + 1) \\
& (5x^2 + 3x + 3)(4x^3 + 3x + 3) & (4x^2 + 4x - 1)(4x^3 + 4x^2 + x - 4) & (x^2 - 2x + 3)(3x^3 + 5x + 3) \\
& (3x^2 - 5x + 3)(3x^3 - 2x^2 - 2x + 4) & (4x^2 - 5)(x^3 - 3x^2 + 3x + 3) & (3x^2 - 3x - 1)(2x^3 + 2x^2 + 3x - 1) \\
& (3x^2 + 3x + 4)(x^3 + 5x - 4) & (4x^2 - 2x - 1)(4x^3 - 5x - 5) & (3x^2 - 3x + 5)(3x^3 + 2x^2 - 3x + 2) \\
& (3x^2 - 5x + 5)(4x^3 - 2x^2 - 5x + 4) & (3x^2 - 3x - 1)(5x^3 + 5x^2 - 5x + 1) & (4x^2 - 5x - 4)(2x^3 - 3x + 5) \\
& (5x^2 - 5x + 1)(5x^3 - 5x^2 - 5x + 1) & (x^2 + x - 5)(4x^3 - 5x^2 - 3x + 2) & (4x^2 + 3x + 1)(2x^3 + 5x + 5) \\
& (4x^2 - 2x - 1)(5x^3 + x^2 - 2x - 2) & (3x^2 - 4x + 4)(5x^3 + 5x + 1) & (5x^2 + 3x - 5)(5x^3 + 3x^2 + 3x - 4) \\
& (5x^2 - 3x + 1)(4x^3 + 5x^2 + 5x - 1) & (4x^2 - 3x + 2)(5x^3 + 4x^2 + 5x - 3) & (4x^2 - 3x - 5)(4x^3 - x - 4) \\
& (x^2 - 3x + 1)(3x^3 + 2x - 1) & (3x^2 - 2)(3x^3 - 5x^2 - 2x - 5) & (x^2 + 2x - 2)(4x^3 + 3x^2 + 5) \\
& (2x^2 - 3x - 3)(3x^3 + 2x^2 + 2x + 5) & (2x^2 + 2x + 5)(5x^3 - x^2 + 5x - 5) & (4x^2 - x + 4)(3x^3 - 3x^2 + 2x + 1) \\
& (4x^2 + 5x + 2)(2x^3 + 3x^2 - x - 3) & (4x^2 - 4x - 1)(3x^3 + 3x^2 + 2) & (5x^2 - x + 3)(5x^3 + 3x^2 - 3x + 2) \\
& (5x^2 - 4x + 5)(5x^3 - x^2 - 5x - 3) & (4x^2 - 5x + 2)(5x^3 + 5x^2 + 2x - 4) & (4x^2 - 2x - 5)(5x^3 + 2x^2 - x - 2) \\
& (4x^2 + x + 1)(x^3 - 2x^2 + x - 3) & (3x^2 - 3x + 2)(x^3 - 4x^2 + 3x + 4) & (5x^2 + x + 4)(4x^3 + 5x^2 - 4x - 2) \\
& (2x^2 + 5x - 2)(x^3 + 2x^2 + 4x + 1) & (4x^2 - 5x + 2)(2x^3 - 5x^2 - 3x + 2) & (4x^2 - 5x - 4)(4x^3 + 4x^2 + 3x - 4) \\
& (4x^2 - 3x + 5)(5x^3 - 5x^2 + 5x - 4) & (5x^2 - 4x - 3)(5x^3 - x^2 - 4x - 3) & (4x^2 + x + 3)(4x^3 + x^2 + 3x - 3)
\end{aligned}$$



# 7. 육차식의 인수분해

## 7.1 일계수 육차식 1형

$$\begin{aligned}(x^3 - 4x^2 - 4x - 3)(x^3 - x^2 + 5x + 4) \\(x^3 + 5x^2 - 3x - 1)(x^3 - 2x^2 - 3x + 3) \\(x^3 - 4x^2 + 3x + 3)(x^3 - 3x^2 - 3) \\(x^3 + 5x^2 - 3x + 4)(x^3 - x^2 + 4x - 3) \\(x^3 + 2x^2 - 4x + 4)(x^3 - 3x - 5) \\(x^3 + x^2 - 4x - 3)(x^3 - 2x^2 + 2x + 1) \\(x^3 - x^2 - 3x + 1)(x^3 - x^2 - x - 5) \\(x^3 + 2x^2 - 3x + 2)(x^3 + 3x^2 - x - 4) \\(x^3 - 3x^2 + 1)(x^3 + 3x^2 - 3) \\(x^3 - 5x^2 - 3x + 1)(x^3 - 5x^2 - 4x + 3) \\(x^3 - x^2 - 5x - 1)(x^3 - 4x^2 + 3x + 4) \\(x^3 - 4x^2 - 4x + 3)(x^3 + 4x^2 + 1) \\(x^3 - x^2 - 4x + 5)(x^3 + 3x^2 - x - 5) \\(x^3 - 2x^2 + 2x - 3)(x^3 + 3x^2 + 5x + 1) \\(x^3 - x + 1)(x^3 - 5x - 3) \\(x^3 - 3x^2 - 4x - 4)(x^3 + 2x^2 + 5x - 4) \\(x^3 + 2x^2 + 4x + 1)(x^3 - x - 1) \\(x^3 + 5x^2 + 3x + 1)(x^3 - x^2 + 4) \\(x^3 - 3x^2 - 4x + 4)(x^3 - 5x^2 - 3) \\(x^3 - 5x - 5)(x^3 - 3x^2 + 5x - 2) \\(x^3 - 4x^2 + 2)(x^3 - x^2 + 4) \\(x^3 + 4x^2 + 3x + 5)(x^3 - 3x - 5) \\(x^3 + 5x^2 - x + 1)(x^3 + 5x^2 - 5) \\(x^3 + 2x^2 - 3x + 1)(x^3 - x + 1) \\(x^3 - 3x^2 + 2x - 4)(x^3 + 5x^2 - x + 1) \\(x^3 - 2x^2 - 3x + 2)(x^3 + 3x^2 - 3x + 1) \\(x^3 + 2x^2 + 5x - 4)(x^3 + 4x^2 + 2x + 1) \\(x^3 - x^2 + 2x + 1)(x^3 - 2x^2 - 2x + 5) \\(x^3 + 3x^2 - 4x - 1)(x^3 + 4x - 2) \\(x^3 - 3x^2 - 3x + 4)(x^3 + 4x^2 + 4x + 2) \\(x^3 - 5x^2 + 5x - 5)(x^3 + 2x^2 - 2) \\(x^3 + 4x^2 - 5x + 5)(x^3 + 3x^2 + x - 4) \\(x^3 + 3x^2 + 5x - 2)(x^3 - 4x^2 + 3x - 4) \\(x^3 - 2x^2 - 5x - 1)(x^3 + 4x^2 + x + 1)\end{aligned}$$

$$\begin{aligned}(x^3 + 2x^2 + 3x - 4)(x^3 - 4x^2 - x + 1) \\(x^3 - x^2 + 5x - 2)(x^3 + 5x^2 + x + 4) \\(x^3 - 2x^2 + 4x + 4)(x^3 - 2x^2 + 4) \\(x^3 - x - 3)(x^3 - x^2 + x - 4) \\(x^3 - 3x^2 + 4x + 5)(x^3 - 4x^2 + 4x - 2) \\(x^3 + 5x^2 + 2x + 5)(x^3 - 2x^2 - 5x + 3) \\(x^3 + 5x - 4)(x^3 - 3x^2 - 2x - 4) \\(x^3 - 4x^2 - 5x - 3)(x^3 + 5x^2 + 4x + 2) \\(x^3 - 2x^2 - 5x + 2)(x^3 - 2x^2 - 2x - 5) \\(x^3 - 5x^2 - 3x + 5)(x^3 - 5x^2 + 2x + 5) \\(x^3 - 2x^2 - 3)(x^3 + 3x^2 - 2x + 4) \\(x^3 - 3x^2 - 2x + 1)(x^3 + 5x^2 - 4x + 3) \\(x^3 + 3x^2 - 5x - 2)(x^3 + 5x^2 + 3x + 1) \\(x^3 + 4x - 2)(x^3 - x^2 + 5x + 4) \\(x^3 - x^2 + 2x - 5)(x^3 + 3x^2 - 5x + 4) \\(x^3 + 4x^2 - x + 3)(x^3 + 4x^2 + 5x + 5) \\(x^3 + 2x^2 - 5x - 4)(x^3 - x^2 + x - 3) \\(x^3 + 5x^2 - 5x - 4)(x^3 - 3x^2 - 2x - 2) \\(x^3 - 5x^2 + x + 1)(x^3 - 2x^2 - 2) \\(x^3 - 5x^2 - 5x + 2)(x^3 + 2x^2 + 5x - 4) \\(x^3 + 5x^2 - 3x + 4)(x^3 - 2x^2 + 2x - 3) \\(x^3 + 3x^2 + 5x - 1)(x^3 + 5x^2 + 3x + 2) \\(x^3 - 3x^2 + 2x - 1)(x^3 + 4x^2 - 4x - 5) \\(x^3 + 2x^2 - 3x + 3)(x^3 - 5x^2 - 3) \\(x^3 - 2x^2 - x + 1)(x^3 + 3x^2 - 2x + 4) \\(x^3 + 2x^2 + 4x + 1)(x^3 - x^2 - 2x + 4) \\(x^3 + 5x^2 - 2x + 3)(x^3 + x^2 - 2x + 4) \\(x^3 + x^2 + 1)(x^3 - 5x^2 + 2x + 1) \\(x^3 - 4x^2 + 4x + 5)(x^3 + x^2 - 3x - 5) \\(x^3 - 3x^2 - x - 4)(x^3 + 3x^2 - x - 1) \\(x^3 - x + 4)(x^3 + 2x^2 - 2x - 5) \\(x^3 + 2x^2 - 4x - 2)(x^3 - 3x^2 + 3x - 3) \\(x^3 - 5x^2 - x - 2)(x^3 + 5x^2 - 3x - 2) \\(x^3 - 5x^2 + 2x - 1)(x^3 + 3x^2 + 2x + 5)\end{aligned}$$

$$\begin{aligned}
&(x^3 + 2x^2 + 2x + 2)(x^3 + 5x^2 - 5x - 4) \\
&(x^3 + 3x^2 - 5x - 5)(x^3 - 3x^2 - x + 1) \\
&(x^3 + 5x^2 - 4x + 5)(x^3 - 5x^2 + x - 3) \\
&(x^3 + 5x^2 - 3x + 2)(x^3 - 2x^2 + 5x - 1) \\
&(x^3 + 5x^2 - 2x - 3)(x^3 - 3x^2 + x - 5) \\
&(x^3 + 2x^2 + 3x + 3)(x^3 - x^2 - 5x - 5) \\
&(x^3 + x^2 - 5x + 2)(x^3 - 5x^2 + 4x - 5) \\
&(x^3 + 2x^2 - 5x + 3)(x^3 + x^2 + 3x + 1) \\
&(x^3 + 2x^2 + 5x + 3)(x^3 + 5x^2 - 5x - 2) \\
&(x^3 + 2x^2 + 5x + 3)(x^3 + 3x^2 - 4x + 2) \\
&(x^3 - 4x^2 - x + 2)(x^3 + 4x^2 - 3x + 4) \\
&(x^3 - x^2 + 5x - 2)(x^3 - 3x^2 + 3x - 4) \\
&(x^3 - 5x^2 + 1)(x^3 - 3x^2 + 3x + 2) \\
&(x^3 - x^2 - 2x + 4)(x^3 + 2x^2 - 5x - 2) \\
&(x^3 - x^2 - 3x - 2)(x^3 - x^2 + 3x + 2) \\
&(x^3 + 4x^2 + 5x - 2)(x^3 - 3x^2 - 5x + 1) \\
&(x^3 - 5x^2 - x + 4)(x^3 - x^2 - 2) \\
&(x^3 + 2x^2 + 5x - 5)(x^3 + 5x^2 - 2x - 1) \\
&(x^3 - x^2 - 2x + 4)(x^3 - 4x^2 + 2x - 3) \\
&(x^3 - x^2 - 4x + 1)(x^3 + 2x^2 + 5x - 4) \\
&(x^3 - 5x^2 + x + 5)(x^3 + 5x^2 + 4x + 1) \\
&(x^3 - 3x^2 - 2x + 3)(x^3 + 5x^2 + 4x + 1) \\
&(x^3 + 4x^2 + 3)(x^3 - 2x^2 - 5x + 3) \\
&(x^3 - 2x^2 - x - 4)(x^3 - 3x^2 - 4x + 1) \\
&(x^3 + 4x^2 - 4x + 1)(x^3 + 2x^2 + 3x - 2) \\
&(x^3 - 2x^2 - x - 3)(x^3 - 3x^2 + x - 1)
\end{aligned}$$

## 7.2 일계수 육차식 2형

$$\begin{aligned}
&(x^2 + 5)(x^2 - 3x + 4)(x^2 - 5x - 3) \\
&(x^2 + 5x - 1)(x^2 + 5x - 4)(x^2 - 5x - 5) \\
&(x^2 + 3x - 2)(x^2 + 3x + 5)(x^2 + 5x + 5) \\
&(x^2 + 3x - 5)(x^2 - 5x - 1)(x^2 + 3x - 2) \\
&(x^2 - 5x + 3)(x^2 - x + 2)(x^2 + 4x - 1) \\
&(x^2 - x - 1)(x^2 + 5)(x^2 + 5x - 5) \\
&(x^2 + 3x - 5)(x^2 - 5x - 5)(x^2 + 3x - 1) \\
&(x^2 + 3x + 4)(x^2 - 4x - 3)(x^2 - x - 3) \\
&(x^2 - 5x + 5)(x^2 + 3x - 5)(x^2 - x + 1) \\
&(x^2 + x - 4)(x^2 + x - 1)(x^2 + 4x + 5) \\
&(x^2 - 2x - 2)(x^2 + 5x + 2)(x^2 + 3x - 3) \\
&(x^2 + 2x - 5)(x^2 - 3x + 1)(x^2 - 3x - 5) \\
&(x^2 + 5x - 5)(x^2 - 2x - 2)(x^2 - 5x + 1) \\
&(x^2 + x + 3)(x^2 - x - 1)(x^2 - x + 3) \\
&(x^2 + x - 4)(x^2 - 5x - 2)(x^2 + x + 1) \\
&(x^2 + 4x + 1)(x^2 - x - 3)(x^2 - 3x - 3) \\
&(x^2 - 3x + 4)(x^2 + 2x + 2)(x^2 - 2x - 5) \\
&(x^2 - 5x - 5)(x^2 + 5x + 5)(x^2 + 3x - 2)
\end{aligned}$$

$$\begin{aligned}
&(x^3 - 5x^2 + 4x - 1)(x^3 + 4x^2 - 2x + 1) \\
&(x^3 + x^2 + 2)(x^3 + x^2 + 4x - 1) \\
&(x^3 - 4x^2 + 3x - 3)(x^3 + 2x^2 + x + 3) \\
&(x^3 + 3x^2 + 3x + 5)(x^3 - 5x^2 - 4x + 1) \\
&(x^3 + 3x^2 - 5)(x^3 + 2x^2 + 5x + 5) \\
&(x^3 - 4x^2 - x - 4)(x^3 + 4x^2 + 3x + 4) \\
&(x^3 + 3x^2 + 2x - 3)(x^3 + x - 5) \\
&(x^3 + 4x^2 + 3x - 1)(x^3 + 5x^2 + x + 4) \\
&(x^3 - x^2 - 5x - 4)(x^3 - 4x^2 - 3x - 5) \\
&(x^3 + 5x + 5)(x^3 - 3x^2 - 3x - 5) \\
&(x^3 + 5x^2 + 4x - 5)(x^3 + 4x^2 + 4x - 4) \\
&(x^3 - 3x^2 + 5x - 5)(x^3 + 5x^2 + 5x + 5) \\
&(x^3 - 4x^2 - 2x + 2)(x^3 - 2x - 3) \\
&(x^3 + 2x^2 - 3x + 1)(x^3 + x^2 + 3x + 2) \\
&(x^3 + 2x^2 - 2x + 2)(x^3 + x^2 + x - 4) \\
&(x^3 + 3x^2 + 2x - 1)(x^3 + 3x^2 + 2x - 1) \\
&(x^3 - x^2 - x - 4)(x^3 + 5x^2 + 5x - 5) \\
&(x^3 + 4x^2 - 3x + 3)(x^3 - 3x^2 - 2x - 3) \\
&(x^3 + 2x^2 + 5x - 3)(x^3 + 3x^2 + 5x + 2) \\
&(x^3 + 3x^2 - x - 4)(x^3 + 3x^2 + 3x - 4) \\
&(x^3 - x^2 + 5x + 4)(x^3 + 3x^2 + 4) \\
&(x^3 - 3x^2 + 4x + 3)(x^3 + 5x^2 + 4x + 1) \\
&(x^3 + 5x^2 + 3x + 3)(x^3 + 2x^2 + 5x + 2) \\
&(x^3 - 2x^2 + 5x - 1)(x^3 + 5x^2 - x - 2) \\
&(x^3 - 5x^2 + 4x + 1)(x^3 + 3x^2 - 5) \\
&(x^3 - x^2 - 4x + 3)(x^3 + 4x^2 - 3x + 2)
\end{aligned}$$

$$\begin{aligned}
&(x^2 - x + 1)(x^2 + 3x - 1)(x^2 + x + 3) \\
&(x^2 - 3x + 3)(x^2 + 3x - 1)(x^2 + x - 5) \\
&(x^2 - x - 3)(x^2 - 4x - 2)(x^2 + 3x + 5) \\
&(x^2 - 3x - 3)(x^2 - 2x + 4)(x^2 + 5x + 1) \\
&(x^2 + 2x - 2)(x^2 + x - 4)(x^2 + 3x + 1) \\
&(x^2 - 5x - 3)(x^2 - 2x + 3)(x^2 + 2x - 1) \\
&(x^2 - 5x + 5)(x^2 - 2)(x^2 + 3x - 5) \\
&(x^2 - x - 3)(x^2 + x + 4)(x^2 + x - 3) \\
&(x^2 + 2x + 2)(x^2 + 5x + 5)(x^2 - x + 3) \\
&(x^2 + 2x - 5)(x^2 - x + 2)(x^2 - 4x - 1) \\
&(x^2 + x + 3)(x^2 + 3x - 2)(x^2 - 5x - 4) \\
&(x^2 + 2x + 5)(x^2 + 5x - 4)(x^2 + 5x - 4) \\
&(x^2 - 4x - 3)(x^2 + 4x - 4)(x^2 + 4x + 2) \\
&(x^2 + 4x - 3)(x^2 + 3x + 5)(x^2 - 3x - 2) \\
&(x^2 + x - 3)(x^2 + 5x - 2)(x^2 - 2x - 2) \\
&(x^2 - 3x + 4)(x^2 - 5x - 2)(x^2 + 4x + 5) \\
&(x^2 + 5x - 2)(x^2 + x + 3)(x^2 + 5x - 2) \\
&(x^2 + 1)(x^2 + x + 1)(x^2 - x - 1)
\end{aligned}$$

$$\begin{aligned}
& (x^2 - 2x + 5)(x^2 + 5x - 1)(x^2 - 5) \\
& (x^2 + 5x - 5)(x^2 + 4x - 3)(x^2 - 4x + 5) \\
& (x^2 + 3)(x^2 - 4x - 3)(x^2 - 3x + 5) \\
& (x^2 + 3)(x^2 - 4x + 1)(x^2 - 2x - 2) \\
& (x^2 + x - 4)(x^2 - x - 5)(x^2 + x - 1) \\
& (x^2 + 5x + 5)(x^2 - x + 5)(x^2 - x + 5) \\
& (x^2 - 5x - 1)(x^2 - 2x + 2)(x^2 + x + 3) \\
& (x^2 - 4x + 1)(x^2 - x + 3)(x^2 - 3) \\
& (x^2 + 2)(x^2 + 5)(x^2 + 3) \\
& (x^2 - 2x - 4)(x^2 - x + 2)(x^2 - 4x - 3) \\
& (x^2 - 5x + 5)(x^2 + x - 3)(x^2 + 3x + 4) \\
& (x^2 - 5x - 1)(x^2 + 5x + 1)(x^2 + 5x + 2) \\
& (x^2 + 4x + 1)(x^2 - x + 3)(x^2 + 4x + 5) \\
& (x^2 - 2x - 5)(x^2 - 5x + 5)(x^2 + 5x + 1) \\
& (x^2 - 5x - 1)(x^2 + 2x + 4)(x^2 + x - 4) \\
& (x^2 - x + 2)(x^2 + 4)(x^2 + 3x + 5) \\
& (x^2 + 5x - 5)(x^2 + 4x + 2)(x^2 - 3x + 5) \\
& (x^2 + 4x - 3)(x^2 + 4x - 3)(x^2 + 2x + 3) \\
& (x^2 - 4x + 2)(x^2 + 3x + 4)(x^2 + 4x + 5) \\
& (x^2 - 3x + 4)(x^2 + x - 3)(x^2 + 4x - 1) \\
& (x^2 + 2x + 4)(x^2 - 2x - 1)(x^2 + 5x - 4) \\
& (x^2 + 5x + 5)(x^2 - 3x - 2)(x^2 - 2x - 5) \\
& (x^2 + 3x - 2)(x^2 - x + 2)(x^2 - 3x - 3) \\
& (x^2 + 3x + 5)(x^2 - 4x - 1)(x^2 - 3x - 3) \\
& (x^2 - x + 3)(x^2 + 4x - 3)(x^2 - x + 2) \\
& (x^2 + 4)(x^2 - 4x - 4)(x^2 + x + 2) \\
& (x^2 + 4x - 4)(x^2 + 2x + 2)(x^2 + 4) \\
& (x^2 - 2x + 5)(x^2 - x - 1)(x^2 + 2x - 1) \\
& (x^2 + 3x + 4)(x^2 - x + 2)(x^2 + 5x - 1) \\
& (x^2 - 3x + 1)(x^2 + 3x + 1)(x^2 - 2x + 2) \\
& (x^2 + 2x - 5)(x^2 + 5)(x^2 + 5x + 1) \\
& (x^2 - x - 4)(x^2 - 2x + 5)(x^2 - 3x - 1) \\
& (x^2 + 3x - 5)(x^2 + 5x + 5)(x^2 - 5x - 2) \\
& (x^2 - 4x - 2)(x^2 - 4x - 2)(x^2 - 3x - 2) \\
& (x^2 + x + 5)(x^2 - 2x - 5)(x^2 + x + 5) \\
& (x^2 - x + 4)(x^2 + 4x - 4)(x^2 + 4) \\
& (x^2 - 2)(x^2 + x + 1)(x^2 + x + 4) \\
& (x^2 + x + 2)(x^2 - 3x + 4)(x^2 + 4x - 3) \\
& (x^2 + 5x + 1)(x^2 + 2x - 1)(x^2 + 2x + 3) \\
& (x^2 - 3x - 3)(x^2 + x + 5)(x^2 - 4x - 4) \\
& (x^2 - 5x - 5)(x^2 + x + 4)(x^2 + 2x - 1) \\
& (x^2 - 5x + 2)(x^2 - 5x - 4)(x^2 + 3x + 1)
\end{aligned}$$

$$\begin{aligned}
& (x^2 - 4x + 5)(x^2 - 4x + 5)(x^2 - 2) \\
& (x^2 - 2x + 3)(x^2 + 5x - 3)(x^2 - 5x + 1) \\
& (x^2 - 3x - 5)(x^2 - 2x + 2)(x^2 + 2x - 4) \\
& (x^2 + 5x - 2)(x^2 - 3x - 3)(x^2 - x - 1) \\
& (x^2 + 2x + 4)(x^2 - 3)(x^2 + 2x - 2) \\
& (x^2 + x - 5)(x^2 - 5x - 1)(x^2 + 5x + 2) \\
& (x^2 - 2x - 2)(x^2 - x - 3)(x^2 + 4x - 4) \\
& (x^2 - 5x + 1)(x^2 - 5x - 3)(x^2 + 4x - 1) \\
& (x^2 + 3x - 3)(x^2 + 5x + 1)(x^2 + 5x - 3) \\
& (x^2 + x + 5)(x^2 - 4x + 2)(x^2 + 5x - 5) \\
& (x^2 - 5x + 3)(x^2 + 2x + 3)(x^2 + x + 2) \\
& (x^2 + x - 4)(x^2 - 3x - 3)(x^2 - 3x + 1) \\
& (x^2 + 2x + 4)(x^2 + x - 4)(x^2 + x + 4) \\
& (x^2 - 2x + 5)(x^2 + 2x + 5)(x^2 + 2) \\
& (x^2 - x + 3)(x^2 - x - 3)(x^2 - 5x + 2) \\
& (x^2 - 2x - 5)(x^2 - 4x + 2)(x^2 + 3x + 4) \\
& (x^2 + 2x - 5)(x^2 - 4x + 2)(x^2 + 2x + 4) \\
& (x^2 + 5x - 2)(x^2 + 4x + 5)(x^2 + 3x - 2) \\
& (x^2 - 5x - 3)(x^2 + 5x + 1)(x^2 + 3x - 3) \\
& (x^2 + 1)(x^2 + x - 1)(x^2 + x - 1) \\
& (x^2 - 3x - 5)(x^2 - 4x - 3)(x^2 - 2x + 2) \\
& (x^2 + 5x - 5)(x^2 + 4x - 1)(x^2 + 5x + 2) \\
& (x^2 - x + 5)(x^2 + x - 3)(x^2 + x + 1) \\
& (x^2 + 4x - 2)(x^2 - 5x - 2)(x^2 + 1) \\
& (x^2 + 5x + 2)(x^2 + 2x - 2)(x^2 - x + 5) \\
& (x^2 - 4x + 5)(x^2 + 5x - 2)(x^2 + x - 4) \\
& (x^2 - 5x - 1)(x^2 - 3x + 1)(x^2 - 2x + 4) \\
& (x^2 + 5x - 1)(x^2 + 5x + 5)(x^2 - 3x - 5) \\
& (x^2 - 5)(x^2 + 4x - 4)(x^2 - 2x - 4) \\
& (x^2 + x + 1)(x^2 - 4x - 2)(x^2 + 2x - 1) \\
& (x^2 - 3)(x^2 - 5x - 1)(x^2 - 5x + 1) \\
& (x^2 + 4x - 3)(x^2 - 3)(x^2 - 2x - 2) \\
& (x^2 - 2x - 1)(x^2 - 4x - 1)(x^2 - x + 4) \\
& (x^2 - 5x - 2)(x^2 - 3x + 4)(x^2 + 4x + 2) \\
& (x^2 - 5x - 2)(x^2 - x - 4)(x^2 - 5x - 3) \\
& (x^2 + 2x + 5)(x^2 - 4x - 4)(x^2 + 3x + 3) \\
& (x^2 + x + 3)(x^2 + 3x + 1)(x^2 - 5x + 3) \\
& (x^2 + 4x + 1)(x^2 + 5x + 1)(x^2 - 4x + 5) \\
& (x^2 + 2x + 4)(x^2 - 3x - 2)(x^2 - 2) \\
& (x^2 + 3x + 1)(x^2 - 4x - 1)(x^2 + 1) \\
& (x^2 - 3x + 3)(x^2 - x - 3)(x^2 - 3x - 3) \\
& (x^2 + 5x + 2)(x^2 - x - 1)(x^2 + 5x - 4)
\end{aligned}$$

### 7.3 일계수가 아닌 육차식 1형

$$\begin{aligned}
& (5x^3 + 4x^2 + 2x + 2)(x^3 - x^2 - 4x + 1) \\
& (3x^3 - 2x^2 + 3x - 5)(4x^3 - 5x^2 + 3)
\end{aligned}$$

$$\begin{aligned}
& (4x^3 + x^2 - 4x + 1)(3x^3 - 3x^2 - 2x + 1) \\
& (3x^3 + x^2 + 4)(x^3 + 5x^2 + 5x - 4)
\end{aligned}$$

$$\begin{aligned}
& (4x^3 + 4x^2 + 4x + 1)(5x^3 - 5x^2 + 3x - 1) \\
& (5x^3 - x^2 - 3x - 4)(5x^3 + x^2 - 4) \\
& (5x^3 - x^2 + 5x + 4)(5x^3 - 3x + 3) \\
& (3x^3 + 3x^2 + x + 5)(x^3 - 4x^2 + 2x - 5) \\
& (5x^3 + 2x^2 - 5x - 4)(4x^3 + 5x^2 + 4x - 1) \\
& (5x^3 + 4x^2 + 5)(5x^3 + x^2 - 5x + 2) \\
& (4x^3 + x^2 + x - 4)(2x^3 - x^2 + 5x + 1) \\
& (3x^3 - 2x^2 + 4x - 1)(x^3 - 5x^2 - 4x + 3) \\
& (3x^3 - 5x^2 + 5x + 4)(3x^3 + 3x^2 + 3x + 4) \\
& (3x^3 + 5x^2 - 3x - 4)(2x^3 - 2x^2 + x - 3) \\
& (3x^3 - 2x^2 + 4x + 4)(4x^3 - 3x^2 - 3x + 5) \\
& (4x^3 - 2x - 3)(4x^3 - 2x^2 - 3x + 5) \\
& (3x^3 + 2x - 4)(3x^3 - 2x^2 + 2x + 2) \\
& (4x^3 + 3x^2 + 5x + 5)(3x^3 + 5) \\
& (5x^3 + 5x^2 + 3x - 1)(4x^3 - 3x^2 + 5x + 4) \\
& (4x^3 + 5x^2 - 4x - 4)(2x^3 - x^2 - 3x - 4) \\
& (4x^3 + 2x^2 + 5x - 3)(x^3 + 5x + 4) \\
& (3x^3 - 5x^2 + 5)(3x^3 - 5x^2 - 3x - 1) \\
& (5x^3 - x^2 - 4x + 3)(5x^3 - 4x - 3) \\
& (5x^3 + 3x^2 - 3x + 3)(4x^3 - 3x^2 + 2x + 2) \\
& (5x^3 + 2x^2 - 4x + 4)(4x^3 + 4x^2 + 5x - 5) \\
& (4x^3 + 5x^2 + 3x + 5)(3x^3 - x^2 + x + 1) \\
& (3x^3 - x^2 - 5x + 4)(3x^3 + x^2 + x - 3) \\
& (5x^3 - 3x^2 - 4x - 2)(3x^3 - 5x^2 - 5x - 3) \\
& (2x^3 + 2x^2 + 2x - 5)(2x^3 + 4x^2 + x - 4) \\
& (5x^3 + x^2 - 2x - 2)(4x^3 + 5x^2 + 2x - 5) \\
& (4x^3 + 5x^2 - 2x + 4)(3x^3 - 1) \\
& (2x^3 + x^2 - 3x - 4)(3x^3 + 5x^2 - 3x + 5) \\
& (2x^3 - 3x^2 - 3x - 3)(x^3 + x^2 - x - 4) \\
& (5x^3 - 2x^2 + 4x + 4)(2x^3 - 2x^2 - 2x - 1) \\
& (3x^3 + 3x^2 - 5x + 1)(x^3 - x^2 + 4x - 5) \\
& (3x^3 - 5x^2 + 5x - 1)(4x^3 + x^2 + 3x + 3) \\
& (2x^3 + 5x^2 + 2x - 2)(5x^3 - 3x - 1) \\
& (2x^3 + 2x^2 - 4x - 3)(4x^3 - 4x^2 + x + 3) \\
& (x^3 + 5x - 1)(4x^3 - 3x^2 - 4x + 1) \\
& (5x^3 + 3x^2 - 3x - 2)(4x^3 + 2x^2 - x + 5) \\
& (x^3 - x^2 + 5x + 3)(4x^3 + x^2 - 4) \\
& (4x^3 - 2x^2 + 3)(4x^3 + 3x^2 - 3x + 4) \\
& (2x^3 - 2x^2 - 3x + 4)(2x^3 + 5x^2 + 4x - 2) \\
& (5x^3 - 2x^2 + 5x + 3)(4x^3 + 5x^2 + 5x - 3) \\
& (4x^3 + 3x^2 + 3x + 5)(2x^3 - 4x^2 + x - 1) \\
& (5x^3 - 2x^2 - x - 5)(4x^3 - x^2 - 2x - 3) \\
& (3x^3 + x^2 - 4x + 5)(3x^3 + 5x - 1) \\
& (3x^3 + 3x^2 - 4x - 5)(4x^3 + 4x^2 + 4x - 5) \\
& (x^3 - x^2 + 3x - 4)(2x^3 - 5x^2 - x - 2) \\
& (4x^3 + 4x^2 - x - 5)(5x^3 - 3x^2 + x + 3) \\
& (4x^3 - 5x^2 - x + 3)(4x^3 + 5x^2 - 5x + 3)
\end{aligned}$$

$$\begin{aligned}
& (5x^3 + 3x^2 - x - 4)(5x^3 - 3x^2 + 4x + 5) \\
& (4x^3 + 4x^2 - 3x - 1)(4x^3 - 5x^2 + 3x + 3) \\
& (2x^3 - 5x^2 + 4x + 2)(x^3 - 5x - 5) \\
& (2x^3 - 2x^2 + 2x - 3)(5x^3 + x + 4) \\
& (3x^3 - 5x^2 - 1)(3x^3 + x^2 - 5x - 2) \\
& (x^3 + 3x^2 + 4)(3x^3 - x - 1) \\
& (3x^3 - 3x^2 + 4x + 4)(3x^3 - 5x^2 - 4x + 2) \\
& (5x^3 + x^2 - 2x - 2)(5x^3 - x^2 + x - 2) \\
& (3x^3 + x^2 - 2x + 5)(x^3 - 4x^2 + 4x + 5) \\
& (5x^3 - 3x^2 + 3x - 3)(2x^3 + 2x^2 - 4x + 5) \\
& (2x^3 - x^2 - 3x + 4)(2x^3 + 2x^2 + 2x - 3) \\
& (4x^3 + 3x^2 - 5)(4x^3 - x^2 + 1) \\
& (x^3 - 3x^2 + 2x - 3)(4x^3 - x^2 - 4x - 5) \\
& (5x^3 + 2x + 3)(2x^3 - 4x^2 - 2x - 5) \\
& (3x^3 + 5x^2 + 2x + 3)(2x^3 + 4x^2 + x - 3) \\
& (3x^3 - 3x^2 - 3x + 5)(4x^3 - 2x^2 - 5) \\
& (3x^3 - 3x + 4)(2x^3 - x^2 + 4x - 1) \\
& (5x^3 - 2x + 4)(x^3 + 2x^2 + 4x + 5) \\
& (3x^3 + x^2 + x - 3)(2x^3 + x^2 + 3x + 2) \\
& (4x^3 + 4x^2 - 2x + 5)(3x^3 + x^2 + x - 1) \\
& (3x^3 + 5x^2 - 5x - 5)(x^3 - 2x - 3) \\
& (2x^3 - 3x + 2)(x^3 - x^2 + 5) \\
& (3x^3 - 4x^2 + x - 2)(3x^3 + 3x^2 + 3x + 2) \\
& (4x^3 + x^2 + 2x - 5)(x^3 + 3x^2 + 2x + 3) \\
& (3x^3 - 5x^2 + 5x - 5)(4x^3 - 3x^2 - 2x + 3) \\
& (x^3 - x^2 - 2x - 3)(4x^3 + 4x^2 + 3x + 5) \\
& (4x^3 - 2x^2 - 3x - 3)(2x^3 + 5x^2 - 4x + 4) \\
& (3x^3 + x^2 + 2x - 3)(2x^3 - 4x^2 - 5x - 5) \\
& (x^3 + 3x^2 - 5x + 4)(2x^3 - 5x^2 - 3x - 3) \\
& (4x^3 - 2x^2 + 5x + 5)(3x^3 + x^2 - 5) \\
& (3x^3 + 3x^2 + x - 3)(2x^3 + 4x^2 + 5x - 4) \\
& (3x^3 + 3x^2 + 4x + 2)(2x^3 + x^2 + 4x - 2) \\
& (5x^3 - 5x^2 + x + 2)(x^3 + 2x^2 + 2x + 3) \\
& (3x^3 - 4x + 2)(x^3 - 5x^2 + 2) \\
& (x^3 + 2x^2 - 2x - 5)(5x^3 + 2x^2 + x + 3) \\
& (2x^3 - 2x^2 + 3x - 2)(5x^3 - x^2 - 3x + 1) \\
& (2x^3 + 3x^2 + x - 3)(5x^3 + 4x^2 + 2x + 1) \\
& (x^3 - x^2 + 1)(2x^3 + 2x^2 + 2x + 1) \\
& (3x^3 - 3x^2 + 3x + 1)(x^3 - x^2 + 5x + 2) \\
& (5x^3 - 5x^2 + 2x + 5)(5x^3 - 4x^2 + 2x + 5) \\
& (x^3 + 4x^2 - 5x - 2)(4x^3 - 3x^2 + 4x + 1) \\
& (3x^3 - 3x^2 - 5x + 4)(3x^3 + x^2 - 5x + 4) \\
& (4x^3 + 5x^2 + x + 3)(2x^3 - 2x^2 + 3x - 1) \\
& (5x^3 - 5x^2 + x + 1)(3x^3 + x^2 - x + 5) \\
& (x^3 - 4x^2 + 5x - 3)(4x^3 - 3x^2 - 3) \\
& (4x^3 - x^2 + 5x - 4)(x^3 - 3x^2 + x - 1) \\
& (4x^3 - 3x^2 + 2x - 2)(4x^3 + 3x^2 + 4x - 1)
\end{aligned}$$

$$\begin{aligned}
& (5x^3 + 5x^2 + 4x - 1)(5x^3 - 2x^2 - 3x + 1) \\
& (2x^3 + x^2 + 2x - 2)(2x^3 - 5x^2 - 3x + 1) \\
& (x^3 + x^2 + 4x + 1)(4x^3 - 4x^2 + 5x - 4) \\
& (2x^3 - 4x^2 + x - 4)(5x^3 + 5x^2 + 4x + 5) \\
& (2x^3 + 3x - 1)(5x^3 - 3x^2 - 1) \\
& (3x^3 + 4x^2 + x - 4)(x^3 - 4x^2 + 2x - 5) \\
& (5x^3 + 4x^2 + x + 4)(4x^3 + 5x^2 + 4x + 4) \\
& (4x^3 + 4x^2 - 3x - 4)(3x^3 - 2x^2 - 3) \\
& (5x^3 + 3x^2 - 3x + 2)(3x^3 - 5x + 5) \\
& (2x^3 - 3x^2 - 5)(2x^3 + 5x^2 - 2x + 2) \\
& (2x^3 + 5x^2 - 3x - 1)(5x^3 + x^2 - 3x - 2)
\end{aligned}$$

## 7.4 일계수가 아닌 육차식 2형

$$\begin{aligned}
& (5x^2 - 4x + 5)(5x^2 - 4x - 3)(3x^2 + 4x + 3) \\
& (x^2 - 3x - 3)(4x^2 + 5x + 2)(3x^2 + 4x + 5) \\
& (4x^2 - 3x + 4)(x^2 - x + 3)(5x^2 - x - 3) \\
& (x^2 - 5x + 3)(2x^2 - 3x - 4)(4x^2 + 5x + 4) \\
& (4x^2 - 3x - 3)(3x^2 - x - 1)(3x^2 + 5x + 4) \\
& (4x^2 - x - 1)(5x^2 + 5x - 3)(3x^2 + 3x + 1) \\
& (3x^2 + 3x - 2)(3x^2 + x - 1)(3x^2 + 2x + 4) \\
& (x^2 + 5x - 1)(3x^2 + 3x - 4)(3x^2 - 2x - 3) \\
& (5x^2 + 4x + 3)(3x^2 + 2x - 4)(2x^2 + 5x - 5) \\
& (x^2 - 5x - 2)(3x^2 + 2x - 2)(3x^2 - 5x + 4) \\
& (3x^2 + 4x - 1)(5x^2 - 2x + 4)(4x^2 - x + 5) \\
& (x^2 + 4x - 3)(3x^2 + 4x + 3)(x^2 - 5x + 3) \\
& (5x^2 + x - 5)(2x^2 - x - 2)(2x^2 - 5x + 1) \\
& (x^2 - 4x + 2)(2x^2 + 3x + 3)(5x^2 - x + 5) \\
& (3x^2 - 4)(2x^2 - x + 5)(3x^2 + 3x + 2) \\
& (3x^2 + 2x + 5)(x^2 + 3x + 1)(5x^2 - 4x + 4) \\
& (5x^2 - 5x - 4)(3x^2 - 4x - 3)(5x^2 + 3x + 5) \\
& (x^2 + 5x - 4)(5x^2 + 2x + 1)(5x^2 + 5x + 3) \\
& (x^2 + 5x + 3)(x^2 - 4x + 1)(4x^2 + 2x - 1) \\
& (3x^2 - 5x + 4)(x^2 - 5x - 4)(2x^2 - 4x + 3) \\
& (2x^2 + 4x - 3)(4x^2 + x + 4)(4x^2 - 5x + 2) \\
& (3x^2 - 5x - 1)(x^2 + 3x + 3)(5x^2 - 2x + 5) \\
& (5x^2 - 4x + 3)(2x^2 + 3x - 4)(5x^2 + 3x + 3) \\
& (3x^2 + 4x - 5)(2x^2 - 2x + 5)(5x^2 + 2x + 3) \\
& (x^2 - 2x - 1)(3x^2 + 2x - 3)(5x^2 + x + 2) \\
& (x^2 + x - 5)(5x^2 - x - 3)(5x^2 + 4x - 4) \\
& (3x^2 - 3x + 1)(3x^2 + 5)(4x^2 + 5x + 3) \\
& (2x^2 - x + 2)(4x^2 + 5)(x^2 + 4) \\
& (3x^2 + 3x - 2)(x^2 - 2x - 1)(x^2 + 5x + 3) \\
& (4x^2 - 3x + 3)(2x^2 + 4x - 3)(5x^2 + 5x + 1) \\
& (3x^2 - 5)(5x^2 - 3x - 3)(5x^2 + 3x + 2) \\
& (5x^2 - 3x - 1)(2x^2 - 4x - 3)(4x^2 + 3x + 2) \\
& (x^2 + x - 1)(x^2 + 3x - 1)(4x^2 - 4x + 3)
\end{aligned}$$

$$\begin{aligned}
& (4x^3 - x^2 + 5x + 2)(5x^3 - x^2 + x + 1) \\
& (x^3 + 2x - 5)(5x^3 - 4x^2 - 2x - 4) \\
& (2x^3 + 4x^2 - 2x + 5)(3x^3 - 5x^2 + 2x + 3) \\
& (3x^3 - 2x^2 + 3)(3x^3 - x^2 - 5x + 5) \\
& (4x^3 + 5x^2 + x + 3)(5x^3 + 5x^2 - 4) \\
& (5x^3 - 3x^2 + 4x - 1)(x^3 - 2x^2 - 4x - 2) \\
& (4x^3 + 3x^2 + 5)(3x^3 + x^2 + 3) \\
& (2x^3 + x^2 - 5x + 1)(4x^3 - 3x^2 - 4x - 2) \\
& (5x^3 - x^2 - 2x - 1)(4x^3 - 4x^2 + 3x + 4) \\
& (2x^3 + 5x^2 - 3x + 3)(4x^3 + 4x^2 + 3x + 5) \\
& (3x^3 + 5x^2 + 4x - 3)(4x^3 + x^2 - 5x + 2)
\end{aligned}$$

$$\begin{aligned}
& (2x^2 - x - 5)(5x^2 - 4x + 1)(5x^2 - 3x - 5) \\
& (3x^2 - 3x - 2)(4x^2 - x + 5)(3x^2 + x + 2) \\
& (x^2 + 5x - 1)(4x^2 - 2x + 5)(5x^2 - x - 3) \\
& (3x^2 + 3x - 2)(x^2 - 4x + 5)(4x^2 - 4x - 5) \\
& (4x^2 + 5x + 4)(5x^2 - 4x - 5)(5x^2 + 5x - 4) \\
& (3x^2 - 4x - 2)(5x^2 - 3x + 5)(4x^2 - 5x - 4) \\
& (x^2 - 5x + 3)(5x^2 + 4x + 2)(x^2 - x - 3) \\
& (3x^2 + 2x + 5)(4x^2 + 5x - 2)(5x^2 + 1) \\
& (2x^2 - 5)(4x^2 + 5x + 4)(3x^2 - 2x + 5) \\
& (x^2 + 3x + 4)(3x^2 + x - 3)(2x^2 - 2x - 3) \\
& (2x^2 + 5x + 5)(4x^2 - 3x + 5)(x^2 + x + 4) \\
& (4x^2 + x - 2)(3x^2 - 4x - 3)(3x^2 + 2x + 1) \\
& (3x^2 - 5x + 3)(5x^2 + 3x + 5)(x^2 - x + 5) \\
& (3x^2 + 2x + 2)(x^2 - 5)(5x^2 - x - 5) \\
& (4x^2 - 3x + 1)(3x^2 + 5x + 3)(3x^2 + 5x + 1) \\
& (3x^2 + 3x + 4)(2x^2 - 2x + 1)(3x^2 - x + 1) \\
& (5x^2 - 5x - 1)(5x^2 - 3x + 4)(x^2 - 3) \\
& (3x^2 - 3x + 2)(3x^2 - 5x - 5)(4x^2 - 2x - 1) \\
& (x^2 - 3x + 4)(x^2 - 2x - 5)(5x^2 - 1) \\
& (4x^2 + 3)(3x^2 + 4x - 3)(3x^2 + 5) \\
& (x^2 - 3x - 2)(5x^2 - 3x - 4)(4x^2 - 3x - 5) \\
& (5x^2 + 5x - 1)(4x^2 + 3x + 4)(5x^2 - 3) \\
& (5x^2 + x + 5)(4x^2 - 3x - 5)(3x^2 + 4x - 3) \\
& (5x^2 + x - 2)(x^2 - 5x - 3)(3x^2 - 5x + 3) \\
& (5x^2 + 5x + 2)(2x^2 - x - 4)(x^2 + 5x + 1) \\
& (x^2 - 5x + 3)(3x^2 - 5)(4x^2 - 3x + 4) \\
& (5x^2 - x - 5)(4x^2 - x - 1)(x^2 + 2x - 1) \\
& (4x^2 - x - 2)(4x^2 - x + 4)(5x^2 + x - 2) \\
& (2x^2 + 5x + 5)(x^2 - 5x + 5)(3x^2 + 4x - 1) \\
& (3x^2 + 3x + 4)(5x^2 + 3x - 3)(x^2 + 3x + 1) \\
& (x^2 + 3x + 1)(2x^2 - x + 4)(x^2 + 3x + 5) \\
& (2x^2 + 1)(3x^2 - 4x - 5)(5x^2 + 3x - 3) \\
& (x^2 - 4x - 2)(x^2 - 4x - 4)(3x^2 + 4x + 5)
\end{aligned}$$

$$\begin{aligned}
& (3x^2 - 5x - 3)(x^2 + 3x + 1)(5x^2 - 5x + 1) \\
& (x^2 + 5x - 2)(4x^2 + x - 4)(x^2 - 2x - 2) \\
& (5x^2 - 3x + 2)(4x^2 - 4x + 3)(x^2 - x + 4) \\
& (3x^2 - x + 1)(x^2 - 4x + 2)(5x^2 - 3x + 4) \\
& (4x^2 + 5x - 4)(x^2 + x - 4)(x^2 - 5x - 1) \\
& (5x^2 - x + 4)(3x^2 - 5x + 3)(x^2 - 5) \\
& (3x^2 - 3x + 5)(5x^2 - 5x + 2)(4x^2 - 3x + 4) \\
& (x^2 - 2)(4x^2 + 3x + 5)(5x^2 - 2x - 2) \\
& (2x^2 + 3x - 3)(2x^2 + 5x + 5)(5x^2 - 4x + 4) \\
& (2x^2 + x + 5)(3x^2 - 2x + 5)(5x^2 - 2x + 5) \\
& (x^2 - 2x - 1)(x^2 + 2x + 3)(3x^2 - 4x + 4) \\
& (4x^2 + 5x - 5)(x^2 + 4)(5x^2 + 2x + 5) \\
& (4x^2 - 5x + 3)(5x^2 - 4x + 4)(5x^2 - 2x + 5) \\
& (x^2 - x + 5)(2x^2 + 4x - 1)(3x^2 - 4x + 2) \\
& (x^2 + 5x + 2)(x^2 - 5x - 5)(3x^2 - 2x + 5) \\
& (5x^2 - x + 3)(5x^2 - 2x - 1)(3x^2 + 2x + 1) \\
& (5x^2 - 2x - 2)(x^2 - 2x + 3)(5x^2 - 3x + 1) \\
& (3x^2 - x - 5)(4x^2 + 4x - 5)(4x^2 + 3x + 5) \\
& (2x^2 + 5x + 5)(3x^2 + 3x + 4)(3x^2 + 2) \\
& (5x^2 - 3x - 4)(5x^2 + 2x + 1)(3x^2 + 5) \\
& (4x^2 + 3x - 5)(3x^2 - 3x + 2)(4x^2 + 5x - 1) \\
& (5x^2 - 4x + 5)(4x^2 - 3x + 3)(x^2 + x + 2) \\
& (4x^2 - x + 2)(5x^2 - x - 2)(4x^2 + 2x + 3) \\
& (4x^2 + x + 4)(4x^2 - 5x + 3)(5x^2 + 3x + 1) \\
& (4x^2 - 3x - 4)(2x^2 + 1)(3x^2 + x + 1) \\
& (2x^2 - x - 4)(x^2 + 2x - 4)(4x^2 + 5x - 2) \\
& (2x^2 + 3x - 1)(2x^2 - 1)(4x^2 - 3x + 3)
\end{aligned}$$

$$\begin{aligned}
& (x^2 - 2x + 2)(3x^2 + 5x - 3)(5x^2 + 2x - 5) \\
& (x^2 - 3x + 4)(5x^2 - 2x + 4)(x^2 + 2x - 5) \\
& (5x^2 - 4x + 4)(5x^2 + 3x + 3)(x^2 - 2) \\
& (5x^2 + x - 5)(4x^2 + 3x + 4)(x^2 + 4x + 5) \\
& (4x^2 - 5x + 4)(2x^2 + 2x + 5)(3x^2 + 2x + 2) \\
& (3x^2 - 3x + 1)(5x^2 + x + 2)(5x^2 - x - 3) \\
& (2x^2 - x - 4)(4x^2 + 3x + 5)(4x^2 - 5x - 1) \\
& (3x^2 + 5x + 3)(2x^2 - 2x - 3)(3x^2 + x - 3) \\
& (5x^2 + 5x + 1)(2x^2 - x + 2)(5x^2 + 2x - 5) \\
& (5x^2 - 2x + 1)(x^2 + 4x + 1)(3x^2 + 4x - 5) \\
& (5x^2 + 4x + 4)(x^2 - x - 3)(3x^2 + 2) \\
& (3x^2 - 5x - 5)(4x^2 + 4x + 3)(5x^2 - 2x - 4) \\
& (5x^2 - 3x + 4)(x^2 + x - 1)(x^2 + x + 2) \\
& (x^2 - 2)(2x^2 + 5x + 5)(5x^2 + 4) \\
& (5x^2 + 2x - 1)(5x^2 + x + 2)(x^2 + x + 1) \\
& (5x^2 - 4x + 4)(3x^2 - 5x + 1)(5x^2 + 2x + 4) \\
& (3x^2 - 3x + 4)(x^2 + 2x - 2)(x^2 + 5x - 4) \\
& (5x^2 - x - 1)(2x^2 + 2x - 1)(x^2 + 2x - 4) \\
& (4x^2 - 2x + 3)(3x^2 - 2x + 2)(2x^2 - 2x - 3) \\
& (5x^2 + 2x - 2)(4x^2 + 3x - 2)(3x^2 - 5x - 3) \\
& (x^2 - 4x - 1)(x^2 - 5x - 5)(4x^2 + x + 4) \\
& (3x^2 - 3x + 1)(4x^2 - 5)(2x^2 - x + 5) \\
& (x^2 + 3x + 5)(4x^2 + 5x - 3)(2x^2 + 2x + 3) \\
& (3x^2 - 5x + 3)(3x^2 + x - 1)(4x^2 + 4x - 1) \\
& (2x^2 - 2x - 1)(2x^2 - 2x - 3)(x^2 + x + 2) \\
& (2x^2 - 5x - 5)(x^2 + 3x - 2)(2x^2 - x - 5) \\
& (3x^2 + 4x + 5)(x^2 + 3x - 5)(3x^2 + 4x + 5)
\end{aligned}$$

# 8. 칠차식의 인수분해

## 8.1 일계수 칠차식

$$\begin{aligned}(x^2 + x - 3)(x^2 + 5x + 2)(x^3 - 2x^2 + 5x + 2) \\ (x^2 + 5x - 1)(x^2 + 3x + 3)(x^3 - 5x^2 - 3x + 5) \\ (x^2 + x + 3)(x^2 + 1)(x^3 + x^2 + 4x - 3) \\ (x^2 - 3x + 4)(x^2 - 4x - 1)(x^3 + x^2 + 4x + 5) \\ (x^2 + 3x - 2)(x^2 + 2x + 4)(x^3 - 5x^2 - 3) \\ (x^2 + 3x - 5)(x^2 + 5x + 5)(x^3 - 4x^2 - 3x - 5) \\ (x^2 + x - 3)(x^2 - 4x + 2)(x^3 - x^2 + 3x + 2) \\ (x^2 + x - 4)(x^2 - 2x + 2)(x^3 + x^2 + 2x - 3) \\ (x^2 + 5x - 1)(x^2 + 2x + 4)(x^3 + 4x^2 - x - 5) \\ (x^2 - 4x + 2)(x^2 + 5x - 4)(x^3 + 4x^2 + 3x - 3) \\ (x^2 - 3x + 4)(x^2 + 2x + 4)(x^3 + 4x^2 - 5x + 3) \\ (x^2 - 4x + 5)(x^2 - 4x + 1)(x^3 + 5x^2 - 3x - 1) \\ (x^2 + 4x - 2)(x^2 - 5x - 4)(x^3 - x^2 - 5x - 4) \\ (x^2 - x + 3)(x^2 - 3x - 3)(x^3 + 3x^2 + 2x - 4) \\ (x^2 - 2x + 2)(x^2 - 5x - 5)(x^3 + 4x^2 + x - 5) \\ (x^2 - 5x - 3)(x^2 + 5x + 5)(x^3 - 3x^2 + 2x + 2) \\ (x^2 - 3x + 1)(x^2 + 3x + 4)(x^3 - 3x^2 - 4x - 4) \\ (x^2 + 3x + 1)(x^2 - 3x - 5)(x^3 - 2x^2 + x + 2) \\ (x^2 - 2x + 5)(x^2 - 3x - 5)(x^3 + x + 4) \\ (x^2 - 3x - 1)(x^2 - 2x - 2)(x^3 + x^2 - x + 4) \\ (x^2 + 2x - 1)(x^2 + 5x + 3)(x^3 - x^2 - 3x - 5) \\ (x^2 - 5x - 4)(x^2 + 4x + 1)(x^3 + 2x^2 - 3x + 3) \\ (x^2 + 4)(x^2 + 2x + 2)(x^3 + 2x^2 + 5x - 4) \\ (x^2 + 4x - 1)(x^2 + x + 3)(x^3 + 5x^2 - 3) \\ (x^2 - 5)(x^2 - 2x + 3)(x^3 + 2x^2 + 4x - 5) \\ (x^2 + 2x + 3)(x^2 - 3)(x^3 - 3x^2 + 5) \\ (x^2 + 3x + 1)(x^2 - 5x - 4)(x^3 - 3x^2 + 3x + 4) \\ (x^2 - 5x - 2)(x^2 + 5x - 3)(x^3 - 4x^2 + x - 1) \\ (x^2 + x + 5)(x^2 + 5x + 2)(x^3 - x^2 + 5) \\ (x^2 - x - 1)(x^2 - 5x + 5)(x^3 - 2x^2 - 5x - 4) \\ (x^2 + x - 5)(x^2 - x - 4)(x^3 + 5x - 5) \\ (x^2 - 3x + 5)(x^2 + 1)(x^3 - 5x^2 - 4x + 5) \\ (x^2 - 2)(x^2 + x - 1)(x^3 - 4x^2 - 4x + 4) \\ (x^2 - 4x - 4)(x^2 - 5x - 5)(x^3 + 5x + 5)\end{aligned}$$

$$\begin{aligned}(x^2 - x - 1)(x^2 + 5x - 4)(x^3 + 2x^2 + 3x - 4) \\ (x^2 + 3x + 4)(x^2 - 2x - 2)(x^3 + 5x^2 + 5x + 2) \\ (x^2 + 5x - 4)(x^2 + 5x - 2)(x^3 + 5x^2 - 3x + 3) \\ (x^2 + 3x - 1)(x^2 + 5x + 3)(x^3 - 5x^2 + 2x - 1) \\ (x^2 + 3x + 3)(x^2 + 5x - 5)(x^3 - 5x^2 - 4x - 5) \\ (x^2 - x - 1)(x^2 - 2)(x^3 + 2x^2 + 2) \\ (x^2 + 3x + 5)(x^2 + 1)(x^3 + 2x^2 + 5x - 1) \\ (x^2 - x - 5)(x^2 - x - 1)(x^3 - 2x - 2) \\ (x^2 - 5x - 2)(x^2 - 3x - 2)(x^3 + 4x^2 - 2x + 1) \\ (x^2 + 3x - 3)(x^2 - 3x + 4)(x^3 - 4x^2 - 5x + 5) \\ (x^2 + 5x - 1)(x^2 + 4x - 3)(x^3 - 5x - 1) \\ (x^2 + 3x - 2)(x^2 - 5x + 2)(x^3 - 2x^2 + 3x + 2) \\ (x^2 - 3x - 1)(x^2 + 4x - 1)(x^3 + 5x^2 - 5x + 1) \\ (x^2 + 2x - 1)(x^2 + 1)(x^3 + x^2 + x + 3) \\ (x^2 + x + 4)(x^2 + 3x + 1)(x^3 + x^2 - 2x + 4) \\ (x^2 + 2x + 5)(x^2 - 3x - 3)(x^3 - x^2 + 4x + 3) \\ (x^2 + 5)(x^2 - x - 5)(x^3 - 5x^2 + 3x - 5) \\ (x^2 + x - 4)(x^2 - 4x - 2)(x^3 + 2x^2 + 4x + 2) \\ (x^2 - 5x + 3)(x^2 + 3x - 1)(x^3 - 5x^2 + 3x + 5) \\ (x^2 + 3x + 5)(x^2 + 5x + 1)(x^3 - 4x^2 + x - 2) \\ (x^2 + x - 3)(x^2 - 5x + 3)(x^3 - 4x^2 - 3x + 5) \\ (x^2 + 4x - 4)(x^2 + x - 5)(x^3 + 5x^2 + 4x + 2) \\ (x^2 - 3x - 3)(x^2 + 2x - 1)(x^3 + x^2 + 3x + 4) \\ (x^2 - 4x - 2)(x^2 + x + 3)(x^3 - 2x^2 + 4x - 4) \\ (x^2 - 2x - 5)(x^2 + 1)(x^3 + 2x^2 - 2x + 1) \\ (x^2 + 4x - 4)(x^2 + 5x + 1)(x^3 - 5x^2 - 5x + 3) \\ (x^2 + 5x - 5)(x^2 - 2x + 3)(x^3 - 3x^2 + 5x + 1) \\ (x^2 - 3x + 4)(x^2 - x + 5)(x^3 - 4) \\ (x^2 + 2x - 4)(x^2 + 5x + 5)(x^3 + 5) \\ (x^2 + 2x - 2)(x^2 - 5x - 2)(x^3 + x^2 + x + 4) \\ (x^2 - 5x - 5)(x^2 + 5x + 5)(x^3 + 5x^2 + 2x - 4) \\ (x^2 - 4x - 3)(x^2 + 3x - 3)(x^3 - 2x^2 - 5x - 5) \\ (x^2 + 5x - 2)(x^2 - 5)(x^3 + 3x^2 + 5x - 2) \\ (x^2 + 3x + 5)(x^2 - x + 2)(x^3 - 3x^2 + x - 5)\end{aligned}$$

$$\begin{aligned}
& (x^2 + 2x - 1)(x^2 + 4x - 2)(x^3 + x^2 - x + 3) \\
& (x^2 - 2)(x^2 + 4x - 2)(x^3 + 3x^2 + 3x - 4) \\
& (x^2 + 2x + 3)(x^2 + 5x + 1)(x^3 + 3) \\
& (x^2 - 2x + 4)(x^2 - x + 1)(x^3 - 2x^2 - 3x + 5) \\
& (x^2 + 5)(x^2 - 3x - 2)(x^3 - 4x^2 - 2x - 1) \\
& (x^2 + x - 3)(x^2 - 5x + 1)(x^3 + 5x^2 + 2x - 1) \\
& (x^2 - 5x + 2)(x^2 + 2x + 2)(x^3 + 5x^2 + 5x - 1) \\
& (x^2 - 2x + 4)(x^2 + x + 2)(x^3 - 5x^2 + 5x + 1) \\
& (x^2 - 2x + 4)(x^2 + 5x - 4)(x^3 + 3x^2 + 5x - 4) \\
& (x^2 - 5x - 1)(x^2 + 4x + 5)(x^3 - x^2 - 5x - 2) \\
& (x^2 + 3x + 1)(x^2 + 3x + 1)(x^3 + x^2 - 4) \\
& (x^2 - 3x + 4)(x^2 - 2x + 2)(x^3 + 5x^2 - 3x - 2) \\
& (x^2 - x + 2)(x^2 - x + 5)(x^3 + 2x^2 + 3x - 4) \\
& (x^2 + 4x + 1)(x^2 + 3x + 3)(x^3 + 4x^2 - 3x + 5) \\
& (x^2 + x + 3)(x^2 + 3x + 3)(x^3 + 2x^2 - 4x - 4) \\
& (x^2 - x + 1)(x^2 + 3x - 3)(x^3 - 3x^2 - 4) \\
& (x^2 + x + 5)(x^2 - 3)(x^3 - 4x^2 + x - 1) \\
& (x^2 - x - 3)(x^2 - 5x - 2)(x^3 + x^2 - 5x + 1) \\
& (x^2 + 3x + 1)(x^2 - 2x + 4)(x^3 + 3x^2 - 3x + 1) \\
& (x^2 - 3x - 3)(x^2 - 4x + 1)(x^3 - x^2 + 3x + 2) \\
& (x^2 + 5x - 2)(x^2 + 4)(x^3 + 3x^2 + x + 4) \\
& (x^2 + x - 5)(x^2 + x + 1)(x^3 + 2x + 4) \\
& (x^2 + x - 1)(x^2 - x + 2)(x^3 + 5x^2 + x + 3) \\
& (x^2 - 5x + 2)(x^2 + x + 1)(x^3 + 5x - 5) \\
& (x^2 + 1)(x^2 + 2)(x^3 + 5x^2 - 2x + 4) \\
& (x^2 - 5x + 3)(x^2 - 4x - 4)(x^3 - 2x^2 + x + 1)
\end{aligned}$$

$$\begin{aligned}
& (x^2 - 3x + 3)(x^2 - x + 3)(x^3 - 4x^2 - x + 2) \\
& (x^2 + 3x - 1)(x^2 + 4x + 2)(x^3 + x + 5) \\
& (x^2 + 3x - 2)(x^2 + x - 4)(x^3 + 5x^2 - 4x + 2) \\
& (x^2 - 5x - 4)(x^2 + x + 3)(x^3 + x^2 - 4x - 3) \\
& (x^2 + 5x - 1)(x^2 + 2x + 5)(x^3 - x^2 - 5x - 2) \\
& (x^2 - 5)(x^2 - 4x + 5)(x^3 + 4x^2 - 2x + 5) \\
& (x^2 - 5x + 5)(x^2 - 3x - 5)(x^3 + x^2 + 2) \\
& (x^2 - 5x + 2)(x^2 - 4x + 5)(x^3 + 4x^2 + 4x - 4) \\
& (x^2 - 3x + 4)(x^2 - 3x - 5)(x^3 - 4x^2 - x + 1) \\
& (x^2 - 3x + 3)(x^2 + 2x + 3)(x^3 - 5x^2 + 3x + 2) \\
& (x^2 - 3x + 5)(x^2 - 4x + 1)(x^3 - 5x^2 + 2x + 1) \\
& (x^2 + x - 1)(x^2 + 3x - 3)(x^3 + 2x + 1) \\
& (x^2 + x - 3)(x^2 - 2)(x^3 - 2) \\
& (x^2 - 5x + 1)(x^2 + 4x - 2)(x^3 - x^2 + 3x + 3) \\
& (x^2 - 3x + 3)(x^2 - 5x - 4)(x^3 + x^2 - 4x + 5) \\
& (x^2 - 2x - 2)(x^2 + 4x + 1)(x^3 + 3x^2 - 4x - 1) \\
& (x^2 - 5x - 5)(x^2 - x - 5)(x^3 + 3x^2 - 4x + 4) \\
& (x^2 + 3x + 5)(x^2 - x + 2)(x^3 + 3x^2 - 4x - 4) \\
& (x^2 + 3x + 5)(x^2 - 5x + 2)(x^3 + 4x^2 + 2x - 5) \\
& (x^2 + 5x - 4)(x^2 - 2x - 4)(x^3 + 2x^2 + 5x + 2) \\
& (x^2 + 2x + 4)(x^2 - 3x - 5)(x^3 - 5x - 3) \\
& (x^2 - 5)(x^2 + 5x + 2)(x^3 - 5x^2 - 2x - 3) \\
& (x^2 + 2x - 2)(x^2 + x + 5)(x^3 + 2x^2 - x - 1) \\
& (x^2 + 3x - 1)(x^2 - 2x - 4)(x^3 - x - 1) \\
& (x^2 + 5x - 4)(x^2 + x + 5)(x^3 + 3x^2 - x - 2) \\
& (x^2 + 2x - 4)(x^2 + 5x + 1)(x^3 + 5x^2 - x - 3)
\end{aligned}$$

## 8.2 일계수가 아닌 칠차식

$$\begin{aligned}
& (4x^2 - 4x + 5)(5x^2 - 1)(5x^3 + 3x - 5) \\
& (4x^2 + 4x - 5)(x^2 - x - 4)(5x^3 - x^2 + x - 3) \\
& (4x^2 + 2x - 3)(3x^2 + 3x + 2)(5x^3 - x^2 + x + 1) \\
& (2x^2 - 4x + 1)(x^2 + 4x + 2)(x^3 + 5x + 4) \\
& (4x^2 - 2x - 1)(5x^2 - 3x + 3)(3x^3 + 5x^2 - 2x - 1) \\
& (x^2 - x + 4)(5x^2 + 2x + 4)(4x^3 + 2x^2 - 2x + 1) \\
& (5x^2 + 1)(5x^2 - 3x + 5)(2x^3 + 2x^2 + x - 4) \\
& (4x^2 - 5x - 5)(5x^2 - 2x - 1)(5x^3 - 3x^2 + 3x - 1) \\
& (3x^2 + 3x + 4)(3x^2 + 4x + 5)(4x^3 + x^2 - 2x - 4) \\
& (4x^2 + 3x + 5)(3x^2 - 5x - 3)(3x^3 + 2x^2 - 3x + 4) \\
& (3x^2 + 4x - 3)(2x^2 + 5x + 5)(4x^3 - 2x^2 - 5x - 1) \\
& (x^2 - 5x - 5)(4x^2 + 2x + 5)(x^3 - 3x^2 - x + 5) \\
& (2x^2 - x + 5)(x^2 - 3x - 2)(x^3 - x^2 + 5x - 4) \\
& (2x^2 - 2x - 1)(x^2 - 2x + 3)(4x^3 - x^2 + 3x - 5) \\
& (4x^2 - 5x - 1)(3x^2 - x + 4)(2x^3 - 3x^2 + x - 3) \\
& (x^2 - 5x - 5)(2x^2 + x + 1)(5x^3 + 5x^2 - 2x - 4) \\
& (x^2 + 2x + 2)(2x^2 + x + 4)(x^3 + x^2 - 2x + 2) \\
& (4x^2 - 2x + 5)(4x^2 + 3x + 5)(3x^3 + 3x^2 + 3x + 5)
\end{aligned}$$

$$\begin{aligned}
& (2x^2 + 5x + 5)(5x^2 - x - 1)(4x^3 - 3x^2 - 3x - 3) \\
& (x^2 - 2x + 5)(2x^2 - 4x + 3)(2x^3 + 4x^2 - 3x - 2) \\
& (2x^2 - 4x + 5)(5x^2 + x - 5)(4x^3 + 5x^2 - 4x - 4) \\
& (4x^2 + 3x - 4)(3x^2 - 4x + 4)(5x^3 - x^2 - 2) \\
& (5x^2 + 5x - 1)(4x^2 + 2x - 1)(4x^3 + 3x^2 - x + 5) \\
& (3x^2 - x + 3)(2x^2 - 1)(4x^3 + 2x^2 - 3) \\
& (5x^2 - 2x + 2)(3x^2 - x - 5)(5x^3 + 5x^2 - x - 5) \\
& (3x^2 - 4x + 2)(5x^2 + 2x - 1)(4x^3 + 4x^2 - 5x - 4) \\
& (4x^2 - 5)(4x^2 - 2x - 5)(5x^3 - 4x^2 + 3x - 5) \\
& (2x^2 - 2x - 5)(5x^2 + 2x - 1)(x^3 + 2x^2 + 5x + 2) \\
& (x^2 + 5x - 1)(4x^2 + x + 4)(x^3 - 4x^2 - 5x + 4) \\
& (2x^2 - x + 1)(4x^2 - 4x - 1)(4x^3 + x^2 + 5x + 3) \\
& (4x^2 + x + 3)(5x^2 - 2x - 4)(3x^3 - 2x^2 - x + 5) \\
& (2x^2 - 3x - 1)(2x^2 + 5x - 1)(3x^3 + 5x^2 - 5x + 5) \\
& (5x^2 + 4x + 3)(5x^2 + x + 5)(2x^3 - 4x^2 + 5x - 5) \\
& (2x^2 + x + 1)(2x^2 + 3x + 3)(3x^3 + 5x^2 + 3x + 3) \\
& (x^2 - 3x + 3)(3x^2 + 2x + 3)(2x^3 + 2x^2 + 2x - 5) \\
& (2x^2 + 2x - 5)(3x^2 - 2)(x^3 - 5x^2 + 4x + 3)
\end{aligned}$$



$$\begin{aligned}
& (2x^2 - 5)(5x^2 + x - 3)(5x^3 + 2x^2 - 4x + 3) \\
& (5x^2 - 3x - 1)(5x^2 + x + 1)(5x^3 - 5x^2 + 2) \\
& (5x^2 + 3x + 2)(3x^2 + 2x + 5)(3x^3 + 5x^2 + 4x - 4) \\
& (3x^2 - 4)(x^2 - 2)(4x^3 + 5x^2 - 4x - 2) \\
& (3x^2 - 2x + 1)(x^2 + 2x + 4)(5x^3 + 3x - 3) \\
& (3x^2 - 5x + 1)(2x^2 - 2x - 1)(5x^3 + 3x^2 + 2x - 4) \\
& (2x^2 - 5x + 4)(3x^2 - 5x - 1)(2x^3 - 3x^2 + x + 1) \\
& (4x^2 - 4x + 5)(2x^2 - 3x - 1)(5x^3 - x^2 - x + 2) \\
& (5x^2 - 2)(4x^2 + 3x - 5)(3x^3 - x^2 + 4x - 3) \\
& (2x^2 - x + 5)(x^2 - 5x + 3)(5x^3 - 4x^2 - 5) \\
& (5x^2 - 3x + 4)(3x^2 + x - 5)(5x^3 - 4x^2 - x - 2) \\
& (5x^2 - 4x - 2)(3x^2 + 2x - 4)(4x^3 + 3x^2 + 5x - 5) \\
& (4x^2 + 4x - 1)(4x^2 + 4x + 5)(2x^3 - 3x^2 - 3x + 5) \\
& (x^2 - 5x + 1)(5x^2 - x + 3)(4x^3 - x^2 + 4x + 3) \\
& (5x^2 + 2x + 1)(2x^2 - 5x - 1)(3x^3 + 5x^2 + 3x - 5) \\
& (4x^2 - 5x - 3)(5x^2 + 5x - 2)(x^3 - 3x^2 + 5x - 5) \\
& (x^2 + 4)(3x^2 + 4x + 3)(x^3 - 5x + 5) \\
& (3x^2 + 5x - 5)(3x^2 - 5x + 4)(x^3 - 4x^2 - 3x + 3) \\
& (5x^2 + 3x - 5)(2x^2 + 3x + 4)(x^3 + 4x^2 + 3x + 1) \\
& (x^2 + 5)(5x^2 - 3x - 4)(4x^3 + 5x^2 + 2x - 4) \\
& (4x^2 - 3x - 3)(x^2 + 3x + 4)(2x^3 + 3x - 3) \\
& (4x^2 + 3x - 3)(4x^2 - x + 2)(x^3 + 3x^2 - 4x + 3) \\
& (3x^2 + x - 3)(5x^2 + 3x - 4)(4x^3 + 2x^2 + 3x + 4) \\
& (x^2 - 2)(4x^2 + 2x + 1)(x^3 + 2x^2 - 5x + 1) \\
& (5x^2 - 4x + 2)(3x^2 - 3x + 5)(4x^3 + 2x^2 + 3x + 1) \\
& (4x^2 + 3x + 2)(3x^2 - 2x + 3)(3x^3 - x^2 + 5x + 1) \\
& (2x^2 + 5x - 5)(3x^2 - 3x - 4)(5x^3 + 3x^2 + 5x + 2) \\
& (2x^2 + 4x + 3)(5x^2 + x - 2)(3x^3 - 4x^2 + x - 1) \\
& (3x^2 - 2x + 2)(3x^2 + x + 4)(2x^3 + x^2 + 5x + 4) \\
& (2x^2 - 4x + 5)(4x^2 + x + 2)(2x^3 - 3x^2 - 3x + 5) \\
& (4x^2 - 5x - 3)(2x^2 + 5x + 5)(4x^3 - 5x^2 + 5x + 3) \\
& (3x^2 - 2x - 2)(x^2 + 5x - 2)(2x^3 + x^2 - 2x + 1) \\
& (3x^2 - 2x - 3)(x^2 + 5x - 5)(x^3 - 3x^2 + 5x + 4) \\
& (2x^2 + 3x - 4)(4x^2 + x + 2)(4x^3 - 4x - 5) \\
& (2x^2 - 5x - 4)(x^2 - x - 4)(5x^3 - x^2 + 4x - 4) \\
& (4x^2 + x - 2)(2x^2 + x + 1)(5x^3 - x^2 + 2x - 2) \\
& (4x^2 + 2x - 1)(x^2 - 3)(3x^3 - 3x - 4) \\
& (2x^2 - x + 2)(x^2 + 4x - 1)(2x^3 - 5x^2 - 2x + 1) \\
& (3x^2 + 5x + 1)(x^2 - 2x - 5)(x^3 + 5x^2 + 3x + 2) \\
& (4x^2 + 5x - 2)(4x^2 - x - 1)(4x^3 - 3x^2 + x - 3) \\
& (5x^2 + 2)(x^2 - 3x - 3)(3x^3 - x^2 + 3x + 3) \\
& (5x^2 - 2x - 4)(3x^2 + 5x + 3)(5x^3 - 2x^2 + 5x + 3)
\end{aligned}$$

$$\begin{aligned}
& (2x^2 + x + 4)(4x^2 + 2x - 5)(2x^3 - 4x^2 - 5x - 5) \\
& (5x^2 - x - 1)(x^2 - 5x + 2)(3x^3 - x + 4) \\
& (x^2 + 4x - 3)(x^2 - x - 3)(5x^3 - 4x^2 + x + 2) \\
& (x^2 - 3x - 3)(2x^2 + x + 5)(x^3 + 5x^2 - 3) \\
& (2x^2 + x + 1)(x^2 + x + 3)(5x^3 - 3x^2 + 5x - 1) \\
& (x^2 + 4)(3x^2 + 5x - 5)(x^3 + 5x^2 - x + 3) \\
& (x^2 - 5x - 1)(3x^2 - 4)(5x^3 + x^2 - x - 4) \\
& (3x^2 - 4x - 1)(2x^2 - x + 5)(5x^3 + 4x^2 - x + 3) \\
& (x^2 + 4x - 2)(3x^2 - 3x - 5)(2x^3 + 3x^2 + 3x - 1) \\
& (5x^2 + 2x + 3)(5x^2 + 4x + 1)(5x^3 + 5x^2 + 3x + 1) \\
& (5x^2 + 1)(2x^2 + 1)(x^3 + x^2 + 4x - 1) \\
& (4x^2 - 4x - 5)(5x^2 - 5x + 1)(x^3 + 5x^2 + 5x + 2) \\
& (2x^2 + 2x - 3)(3x^2 + 4)(x^3 - 5x^2 - 4x + 4) \\
& (5x^2 + x - 2)(5x^2 - 2x + 2)(3x^3 + 5x^2 - 4) \\
& (2x^2 + 2x - 3)(5x^2 + 3x + 4)(5x^3 - 2x^2 - 5) \\
& (4x^2 - x + 1)(3x^2 + 5x - 4)(2x^3 + 3x^2 - 4) \\
& (2x^2 - 2x - 3)(4x^2 - x + 5)(4x^3 - 5x^2 - 2x - 4) \\
& (2x^2 + 4x + 5)(5x^2 + 5x + 4)(3x^3 + 5x^2 - 2x + 1) \\
& (4x^2 - 5x + 5)(3x^2 - 5x - 5)(4x^3 + x^2 - 3) \\
& (5x^2 + 4x + 1)(3x^2 + 5x - 1)(x^3 + x^2 + 4x - 4) \\
& (2x^2 - x + 3)(x^2 - 4x + 1)(3x^3 - x^2 - 3x - 3) \\
& (x^2 - 2x - 4)(x^2 - 4x - 2)(4x^3 + 4x^2 - 4x + 5) \\
& (2x^2 - 3x + 3)(4x^2 - 5x - 2)(2x^3 + 4x + 5) \\
& (2x^2 + x - 2)(x^2 + 5x + 2)(2x^3 - x + 3) \\
& (4x^2 - 3x + 2)(5x^2 + 2x + 5)(4x^3 - 2x^2 - 4x + 3) \\
& (3x^2 + 5x - 1)(x^2 - x - 3)(2x^3 + x^2 + 3x - 5) \\
& (4x^2 + 5x - 1)(4x^2 - x - 2)(2x^3 - 4x^2 + 3x - 2) \\
& (2x^2 - 3x - 3)(4x^2 - 5x - 4)(5x^3 - 3x - 4) \\
& (x^2 - 5x - 2)(4x^2 - 2x - 1)(x^3 + 3x^2 - 3x + 2) \\
& (3x^2 - 4x - 1)(3x^2 + 4x - 1)(x^3 + x^2 + 3x + 4) \\
& (4x^2 + 2x - 3)(2x^2 - 2x + 3)(2x^3 + 4x^2 - x - 4) \\
& (3x^2 + 2x + 5)(2x^2 - 4x + 5)(4x^3 - x^2 + x + 4) \\
& (5x^2 + 2x + 1)(5x^2 - x - 2)(x^3 + x^2 + 2x + 5) \\
& (3x^2 + 3x - 1)(5x^2 + 4x - 4)(5x^3 + 5x^2 + 4x - 5) \\
& (3x^2 + 5x - 3)(5x^2 + 4x - 4)(4x^3 + x^2 - 5x + 4) \\
& (3x^2 + 3x + 4)(2x^2 - 5x + 4)(x^3 - 4x^2 - 3x + 4) \\
& (5x^2 - 3x - 1)(2x^2 - 5x - 2)(2x^3 - 2x^2 + 3x + 5) \\
& (2x^2 - 3x + 5)(4x^2 - x - 1)(3x^3 - 4x^2 + 3x + 3) \\
& (3x^2 + 3x - 5)(5x^2 + 2)(4x^3 + 3x^2 - x - 3) \\
& (x^2 - 5x - 4)(2x^2 + 5x - 2)(5x^3 - 2x^2 + 5) \\
& (5x^2 - 4x - 4)(4x^2 - x + 5)(5x^3 - 5x^2 + 2x + 4) \\
& (4x^2 - 2x - 1)(5x^2 - 4x + 2)(2x^3 - x^2 - 4x + 1)
\end{aligned}$$