① $f(x) = x^2 + 5x - 14$

	x	7
x	x^2	$7x$
-2	$-2x$	-14

$f(x) = (x+7)(x-2)$

$x = -7$

$x = 2$

② $f(x) = x^4 - 3x^2 - 4$ $(x^2)^2 - 3(x^2)^1 -$

Let $A = x^2$

$f(x) = A^2 - 3A - 4$

$a = 1 \quad b = -3 \quad c = -4$

$a \cdot c$

-4

$-4 \quad 1$

$+$

-3

b

	A	-4
A	A^2	$-4A$
1	A	-4

$f(x) = (A+1)(A-4)$

$f(x) = (x^2+1)(x^2-4)$

-4

$-2 \quad 2$

0

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

$x = i \quad x = -i \quad x = -2 \quad x = 2$

$x^2 + 1 = 0$

$-1 \quad -1$

$\sqrt{x^2} = \sqrt{-1}$

$x = \pm i$

③ $f(x) = x^4 + 7x^2 - 30$

Let $A = x^2$

$f(x) = A^2 + 7A - 30$

$a = 1 \quad b = 7 \quad c = -30$

$a \cdot c$

-30

$-3 \quad 10$

$+7$

b

$f(x) = (A-3)(A+10)$

$f(x) = (x^2-3)(x^2+10)$

$x^2 - 3 = 0 \qquad x^2 + 10 = 0$

$\sqrt{x^2} = \sqrt{3} \qquad \sqrt{x^2} = \sqrt{10}$

$x = \pm\sqrt{3} \qquad x = \pm i\sqrt{10}$

$x = \sqrt{3} \quad x = -\sqrt{3} \quad x = i\sqrt{10} \quad x = -i\sqrt{10}$

(4) $f(x)=1x^3+8x^2+19x+12$

$f(x)=(x+3)(x^2+5x+4)$

$$\begin{array}{r|rrrr} -3 & 1 & +8 & +19 & +12 \\ & \downarrow & -3 & -15 & -12 \\ \hline & 1 & 5 & 4 & 0 \text{ Remainder} \end{array}$$

Quad Linear Constant

$f(x)=(x+3)(\underline{x^2+5x+4})$

ac

4

4 1

+

5

6

$f(x)=(x+3)(x+4)(x+1)$

$x=3 \quad x=-4 \quad x=-1$