練習１８

(1) $3ab-2ac=a(3b-2c)$

(2) $12x^3-8x^2y=4x^2(3x-2y)$

(3) $3a^2x+6ax^2+ax=ax(3a+6x+1)$

練習１９

(1) $(a+b)c+d(a+b)=(a+b)(c+d)$

(2) $(a-2b)x+(2b-a)y=(a-2b)x-(a-2b)y$
$=(a-2b)(x-y)$

練習２０

(1) $x^2+10x+25=x^2+2\cdot x\cdot 5+5^2=(x+5)^2$

(2) $x^2-12x+36=x^2-2\cdot x\cdot 6+6^2=(x-6)^2$

(3) $x^2+6xy+9y^2=x^2+2\cdot x\cdot 3y+(3y)^2=(x+3y)^2$

(4) $4a^2-4ab+b^2=(2a)^2-2\cdot 2a\cdot b+b^2=(2a-b)^2$

(5) $x^2-9y^2=x^2-(3y)^2=(x+3y)(x-3y)$

(6) $16a^2-25b^2=(4a)^2-(5b)^2=(4a+5b)(4a-5b)$

練習２１

(1) $x^2+8x+12=x^2+(2+6)x+2\cdot 6=(x+2)(x+6)$

(2) $x^2-7x+12=x^2+(-3-4)x+(-3)\cdot(-4)$
$=(x-3)(x-4)$

(3) $x^2+2x-8=x^2+\{(-2)+4\}x+(-2)\cdot 4$
$=(x-2)(x+4)$

(4) $x^2-5x-6=x^2+(1-6)x+1\cdot(-6)=(x+1)(x-6)$

(5) $a^2-13a+36=a^2+(-4-9)a+(-4)\cdot(-9)$
$=(a-4)(a-9)$

(6) $y^2-y-20=y^2+(4-5)y+4\cdot(-5)=(y+4)(y-5)$

練習２２

(1) $x^2+5xy+6y^2=x^2+(2y+3y)x+2y\cdot 3y$
$=(x+2y)(x+3y)$

(2) $x^2-6xy+8y^2=x^2+(-2y-4y)x+(-2y)\cdot(-4y)$
$=(x-2y)(x-4y)$

(3) $x^2+7ax-18a^2=x^2+\{(-2a)+9a\}x+(-2a)\cdot 9a$
$=(x-2a)(x+9a)$

(4) $x^2-ax-12a^2=x^2+(3a-4a)x+3a\cdot(-4a)$
$=(x+3a)(x-4a)$

練習２３

(1) $3x^2+7x+2=(x+2)(3x+1)$

(2) $2x^2+9x+10=(x+2)(2x+5)$

(1) $1\times\begin{matrix}2\longrightarrow 6\\3\longrightarrow 1\end{matrix}$

3	2	7

(2) $1\times\begin{matrix}2\longrightarrow 4\\2\longrightarrow 5\end{matrix}$

2	10	9

(3) $2x^2-7x+6=(x-2)(2x-3)$

(4) $4x^2+8x-21=(2x-3)(2x+7)$

(3) $1\times\begin{matrix}-2\longrightarrow -4\\2\longrightarrow -3\end{matrix}$

2	6	−7

(4) $2\times\begin{matrix}-3\longrightarrow -6\\7\longrightarrow 14\end{matrix}$

4	−21	8

(5) $6x^2-13x-15=(x-3)(6x+5)$

(6) $2y^2-11y+12=(y-4)(2y-3)$

(5) $1\times\begin{matrix}-3\longrightarrow -18\\6\longrightarrow 5\end{matrix}$

6	−15	−13

(6) $1\times\begin{matrix}-4\longrightarrow -8\\2\longrightarrow -3\end{matrix}$

2	12	−11

(7) $3x^2+5ax-2a^2=(x+2a)(3x-a)$

(8) $6x^2-7ax-3a^2=(2x-3a)(3x+a)$

(7) $1\times\begin{matrix}2a\longrightarrow 6a\\-a\longrightarrow -a\end{matrix}$

3	$-2a^2$	$5a$

(8) $2\times\begin{matrix}-3a\longrightarrow -9a\\a\longrightarrow 2a\end{matrix}$

6	$-3a^2$	$-7a$

(9) $4x^2+13xy-35y^2=(x+5y)(4x-7y)$

(9) $1\times\begin{matrix}5y\longrightarrow 20y\\-7y\longrightarrow -7y\end{matrix}$

4	$-35y^2$	$13y$

練習２４

(1) $x-y=A$ とおく。
$(x-y)^2-5(x-y)+6$
$=A^2-5A+6=(A-2)(A-3)$
$=\{(x-y)-2\}\{(x-y)-3\}$
$=(x-y-2)(x-y-3)$

(2) $x+y=A$ とおく。
$2(x+y)^2-(x+y)-1$
$=2A^2-A-1=(A-1)(2A+1)$
$=\{(x+y)-1\}\{2(x+y)+1\}$
$=(x+y-1)(2x+2y+1)$

練習２５

(1) $x^4-8x^2-9=(x^2)^2-8x^2-9$
$=(x^2+1)(x^2-9)$
$=(x^2+1)(x+3)(x-3)$

(2) $x^4-16=(x^2)^2-4^2$
$=(x^2+4)(x^2-4)$
$=(x^2+4)(x+2)(x-2)$

練習２６

(1) yについて整理すると
$x^2+xy-4x-y+3=(x-1)y+(x^2-4x+3)$
$=(x-1)y+(x-1)(x-3)$
$=(x-1)\{y+(x-3)\}$
$=(x-1)(x+y-3)$

(2) aについて整理すると
$x^2+3ax-9a-9=3(x-3)a+(x^2-9)$
$=3(x-3)a+(x+3)(x-3)$
$=(x-3)\{3a+(x+3)\}$
$=(x-3)(x+3a+3)$

練習２７

(1) $x^2+2xy+y^2-5x-5y+6$
$=x^2+(2y-5)x+(y^2-5y+6)$
$=x^2+(2y-5)x+(y-2)(y-3)$
$=\{x+(y-2)\}\{x+(y-3)\}$
$=(x+y-2)(x+y-3)$

(2) $x^2-3xy+2y^2+x+y-6$
$=x^2+(-3y+1)x+(2y^2+y-6)$
$=x^2+(-3y+1)x+(y+2)(2y-3)$
$=\{x-(y+2)\}\{x-(2y-3)\}$
$=(x-y-2)(x-2y+3)$

(1) $1\times\begin{matrix}y-2\longrightarrow y-2\\y-3\longrightarrow y-3\end{matrix}$

	$2y-5$

(2) $1\times\begin{matrix}-(y+2)\longrightarrow -y-2\\-(2y-3)\longrightarrow -2y+3\end{matrix}$

	$-3y+1$

(3) $3x^2+4xy+y^2+7x+y-6$
$=3x^2+(4y+7)x+(y^2+y-6)$
$=3x^2+(4y+7)x+(y-2)(y+3)$
$=\{x+(y+3)\}\{3x+(y-2)\}$
$=(x+y+3)(3x+y-2)$

(4) $2x^2+5xy+2y^2-x+y-1$
$=2x^2+(5y-1)x+(2y^2+y-1)$
$=2x^2+(5y-1)x+(y+1)(2y-1)$
$=\{x+(2y-1)\}\{2x+(y+1)\}$
$=(x+2y-1)(2x+y+1)$

(3) $1 \times y+3 \longrightarrow 3y+9$, $3 \times y-2 \longrightarrow y-2$, $4y+7$

(4) $1 \times 2y-1 \longrightarrow 4y-2$, $2 \times y+1 \longrightarrow y+1$, $5y-1$

(*p*.21) 発展 練習 1

(1) $(x+2)^3=x^3+3\cdot x^2\cdot 2+3\cdot x\cdot 2^2+2^3$
$=x^3+6x^2+12x+8$

(2) $(x-1)^3=x^3-3\cdot x^2\cdot 1+3\cdot x\cdot 1^2-1^3$
$=x^3-3x^2+3x-1$

(3) $(3a+b)^3=(3a)^3+3\cdot(3a)^2\cdot b+3\cdot 3a\cdot b^2+b^3$
$=27a^3+27a^2b+9ab^2+b^3$

(4) $(x-2y)^3=x^3-3\cdot x^2\cdot 2y+3\cdot x\cdot(2y)^2-(2y)^3$
$=x^3-6x^2y+12xy^2-8y^3$

(*p*.22) 発展 練習 2

(1) $(x+2)(x^2-2x+4)=(x+2)(x^2-x\cdot 2+2^2)$
$=x^3+2^3=x^3+8$

(2) $(x-3y)(x^2+3xy+9y^2)$
$=(x-3y)\{x^2+x\cdot 3y+(3y)^2\}=x^3-(3y)^3$
$=x^3-27y^3$

(*p*.22) 発展 練習 3

(1) $x^3+27=x^3+3^3=(x+3)(x^2-x\cdot 3+3^2)$
$=(x+3)(x^2-3x+9)$

(2) $x^3-1=x^3-1^3=(x-1)(x^2+x\cdot 1+1^2)$
$=(x-1)(x^2+x+1)$

(3) $125x^3+a^3=(5x)^3+a^3=(5x+a)\{(5x)^2-5x\cdot a+a^2\}$
$=(5x+a)(25x^2-5ax+a^2)$