교재 등급

L단계 교재 ①
1~60

기탄® 수학

정답 및 풀이

※ 정답 및 풀이는
따로 보관하고 있다가
채점할 때 사용해 주세요.

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L-1

(1) 2, 3 (2) 5^7 (3) 3, 5
(4) a^8 (5) x^4 (6) x^9
(7) y^6 (8) y^{10} (9) 3, 6
(10) 7^{11} (11) 4, 9 (12) a^{11}
(13) b^8 (14) b^9 (15) x^7
(16) x^{10} (17) y^5 (18) y^{12}

〈풀이〉

※ $x^m \times x^n$
$=(\underbrace{x \times x \times \cdots \times x}_{m\text{개}}) \times (\underbrace{x \times \cdots \times x}_{n\text{개}})$
$=\underbrace{x \times x \times x \times \cdots \times x}_{(m+n)\text{개}}$
$=x^{m+n}$

(1) 지수가 없는 것처럼 보일 때에는 '1'이 생략된 것이다. 즉, 3은 3^1에서 1을 생략하고 나타낸 것으로, 이것은 $x \times 1$을 $1x$가 아니고 x로 나타내는 것과 같다.
$3 \times 3^2 = 3^{1+2} = 3^3$

(2) $5^2 \times 5^5 = 5^{2+5} = 5^7$
(3) $a^3 \times a^2 = a^{3+2} = a^5$
(4) $a^2 \times a^6 = a^{2+6} = a^8$
(5) $x^2 \times x^2 = x^{2+2} = x^4$
(6) $x^6 \times x^3 = x^{6+3} = x^9$
(7) $y^5 \times y = y^{5+1} = y^6$
(8) $y^3 \times y^7 = y^{3+7} = y^{10}$
※ $x^l \times x^m \times x^n = (x^l \times x^m) \times x^n$
$= x^{l+m} \times x^n$
$= x^{l+m+n}$

(9) $2 \times 2^2 \times 2^3 = 2^{1+2+3} = 2^6$
〈다른 풀이〉 $2 \times 2^2 \times 2^3 = 2^{1+2} \times 2^3$
$= 2^3 \times 2^3$
$= 2^{3+3}$
$= 2^6$

(10) $7^4 \times 7^5 \times 7^2 = 7^{4+5+2} = 7^{11}$
(11) $a^4 \times a^3 \times a^2 = a^{4+3+2} = a^9$
〈다른 풀이〉 $a^4 \times a^3 \times a^2 = a^{4+3} \times a^2$
$= a^7 \times a^2$
$= a^{7+2}$
$= a^9$

(12) $a^2 \times a^3 \times a^6 = a^{2+3+6} = a^{11}$
(13) $b^3 \times b^2 \times b^3 = b^{3+2+3} = b^8$
(14) $b^3 \times b^3 \times b^3 = b^{3+3+3} = b^9$
(15) $x^2 \times x^3 \times x^2 = x^{2+3+2} = x^7$
(16) $x^5 \times x^2 \times x^3 = x^{5+2+3} = x^{10}$
(17) $y^2 \times y^2 \times y = y^{2+2+1} = y^5$
(18) $y^3 \times y^4 \times y^5 = y^{3+4+5} = y^{12}$

L-2

(1) 1, 4 (2) $2^8 \times 5^2$ (3) 2, 6, 6
(4) a^4b^{10} (5) a^7b^7 (6) x^5y^2
(7) x^6y^9 (8) x^8y^5 (9) 1, 6, 3, 8
(10) $3^7 \times 4^5$ (11) 4, 11, 11 (12) a^4b^9
(13) $a^{10}b^7$ (14) $x^{15}y^4$ (15) $x^{12}y^6$
(16) x^8y^{11}

〈풀이〉

※ $x^l \times y^m \times x^n = x^l \times x^n \times y^m$
$= x^{l+n} \times y^m$
$= x^{l+n}y^m$

(1) 지수법칙 $a^m \times a^n = a^{m+n}$은 두 수의 밑이 같은 경우에만 쓸 수 있다.
즉, $3^4 \times 7^5$은 더 이상 간단히 할 수 없다.

(2) $2^4 \times 2^4 \times 5^2 = 2^{4+4} \times 5^2 = 2^8 \times 5^2$
(4) $a^4 \times b^2 \times b^8 = a^4 \times b^{2+8} = a^4 \times b^{10} = a^4b^{10}$
(5) $a^4 \times b^7 \times a^3 = a^4 \times a^3 \times b^7$
$= a^{4+3} \times b^7$
$= a^7 \times b^7$
$= a^7b^7$
(6) $x^4 \times x \times y^2 = x^{4+1} \times y^2 = x^5 \times y^2 = x^5y^2$
(7) $x^6 \times y^5 \times y^4 = x^6 \times y^{5+4} = x^6 \times y^9 = x^6y^9$
(8) $x \times y^5 \times x^7 = x \times x^7 \times y^5$
$= x^{1+7} \times y^5$
$= x^8 \times y^5$
$= x^8y^5$
※ $x^k \times y^l \times x^m \times y^n = x^k \times x^m \times y^l \times y^n$
$= x^{k+m} \times y^{l+n}$
$= x^{k+m}y^{l+n}$

(10) $3^2 \times 4^2 \times 4^3 \times 3^5 = 3^2 \times 3^5 \times 4^2 \times 4^3$
$= 3^{2+5} \times 4^{2+3}$
$= 3^7 \times 4^5$
(12) $a \times a^3 \times b^8 \times b = a^{1+3} \times b^{8+1} = a^4 \times b^9 = a^4b^9$
(13) $a^5 \times b \times a^5 \times b^6 = a^5 \times a^5 \times b \times b^6$
$= a^{5+5} \times b^{1+6}$
$= a^{10} \times b^7$
$= a^{10}b^7$
(14) $x^4 \times x^5 \times x^6 \times y^4 = x^{4+5+6} \times y^4$
$= x^{15} \times y^4$
$= x^{15}y^4$
(15) $x^9 \times y \times y^5 \times x^3 = x^9 \times x^3 \times y \times y^5$
$= x^{9+3} \times y^{1+5}$
$= x^{12} \times y^6$
$= x^{12}y^6$
(16) $x^3 \times y^4 \times x^5 \times y^7 = x^3 \times x^5 \times y^4 \times y^7$
$= x^{3+5} \times y^{4+7}$
$= x^8 \times y^{11}$
$= x^8y^{11}$

L - 3

(1) 3, 6 (2) 7^8 (3) 3, 12
(4) a^4 (5) x^{14} (6) x^9
(7) y^6 (8) y^{10} (9) 3, 3, 15
(10) a^{12} (11) x^{21} (12) 4, 8, 11
(13) b^{13} (14) y^{16} (15) 3^{12}
(16) a^{22} (17) x^{25} (18) y^{21}

〈풀이〉

※ $(x^m)^n=\underbrace{x^m\times x^m\times x^m\times\cdots\times x^m}_{n\text{개}}$
$=x^{\overbrace{m+m+m+\cdots+m}^{n\text{개}}}$
$=x^{m\times n}$
$=x^{mn}$

(1) $(2^2)^3=2^{2\times3}=2^6$
(2) $(7^4)^2=7^{4\times2}=7^8$
(3) $(a^3)^4=a^{3\times4}=a^{12}$
(4) $(a^2)^2=a^{2\times2}=a^4$
(5) $(x^7)^2=x^{7\times2}=x^{14}$
(6) $(x^3)^3=x^{3\times3}=x^9$
(7) $(y^3)^2=y^{3\times2}=y^6$
(8) $(y^2)^5=y^{2\times5}=y^{10}$
(9) 지수법칙 $x^m\times x^n=x^{m+n}$을 이용하여 간단히 한 후, 지수법칙 $(x^m)^n=x^{mn}$을 이용한다.
$(7\times7^2)^5=(7^3)^5=7^{3\times5}=7^{15}$
(10) $(a^3\times a^3)^2=(a^6)^2=a^{6\times2}=a^{12}$
(11) $(x^2\times x^3\times x^2)^3=(x^7)^3=x^{7\times3}=x^{21}$
(12) 지수법칙 $(x^m)^n=x^{mn}$을 이용하여 괄호를 푼 다음, 지수법칙 $x^m\times x^n=x^{m+n}$을 이용하여 간단히 한다.
$(5^2)^4\times5^3=5^{2\times4}\times5^3=5^8\times5^3=5^{11}$
(13) $b\times(b^4)^3=b\times b^{4\times3}=b\times b^{12}=b^{13}$
(14) $(y^2)^6\times(y^2)^2=y^{2\times6}\times y^{2\times2}$
$=y^{12}\times y^4$
$=y^{16}$
(15) $(3^3)^2\times3^4\times3^2=3^{3\times2}\times3^4\times3^2$
$=3^6\times3^4\times3^2$
$=3^{12}$
(16) $a\times(a^2)^3\times(a^5)^3=a\times a^{2\times3}\times a^{5\times3}$
$=a\times a^6\times a^{15}$
$=a^{22}$
(17) $(x^2)^5\times(x^5)^2\times x^5=x^{2\times5}\times x^{5\times2}\times x^5$
$=x^{10}\times x^{10}\times x^5$
$=x^{25}$
(18) $(y^3)^3\times(y^4)^2\times(y^2)^2=y^{3\times3}\times y^{4\times2}\times y^{2\times2}$
$=y^9\times y^8\times y^4$
$=y^{21}$

L - 4

(1) 2, 6 (2) $3^5\times7^{18}$ (3) 2, 18
(4) a^8b^{20} (5) $a^{12}b^7$ (6) x^2y^{16}
(7) x^9y^4 (8) $x^{14}y^{20}$ (9) 2, 4, 7
(10) $3^{13}\times5^{14}$ (11) 2, 10, 16 (12) $a^{18}b^{16}$
(13) $a^{20}b^{10}$ (14) x^2y^{23} (15) $x^{21}y^{32}$
(16) $x^{26}y^{18}$

〈풀이〉

(2) $3^5\times(7^3)^6=3^5\times7^{3\times6}=3^5\times7^{18}$
(4) $(a^2)^4\times(b^4)^5=a^{2\times4}\times b^{4\times5}=a^8b^{20}$
(5) $(a^4)^3\times b^7=a^{4\times3}\times b^7=a^{12}b^7$
(6) $x^2\times(y^8)^2=x^2\times y^{8\times2}=x^2y^{16}$
(7) $(x^3)^3\times y^4=x^{3\times3}\times y^4=x^9y^4$
(8) $(x^7)^2\times(y^5)^4=x^{7\times2}\times y^{5\times4}=x^{14}y^{20}$
(10) $(3^4)^2\times3^5\times(5^2)^7=3^{4\times2}\times3^5\times5^{2\times7}$
$=3^8\times3^5\times5^{14}$
$=3^{13}\times5^{14}$
(12) $(a^3)^4\times(b^4)^4\times(a^2)^3=a^{3\times4}\times b^{4\times4}\times a^{2\times3}$
$=a^{12}\times b^{16}\times a^6$
$=a^{18}b^{16}$
(13) $(a^6)^3\times b^3\times a^2\times b^7=a^{6\times3}\times b^3\times a^2\times b^7$
$=a^{18}\times b^3\times a^2\times b^7$
$=a^{20}b^{10}$
(14) $x\times(y^2)^4\times(y^5)^3\times x=x\times y^{2\times4}\times y^{5\times3}\times x$
$=x\times y^8\times y^{15}\times x$
$=x^2y^{23}$
(15) $(x^2)^6\times(x^3)^3\times(y^7)^4\times y^4=x^{2\times6}\times x^{3\times3}\times y^{7\times4}\times y^4$
$=x^{12}\times x^9\times y^{28}\times y^4$
$=x^{21}y^{32}$
(16) $(x^8)^2\times(y^2)^3\times(x^5)^2\times(y^4)^3=x^{8\times2}\times y^{2\times3}\times x^{5\times2}\times y^{4\times3}$
$=x^{16}\times y^6\times x^{10}\times y^{12}$
$=x^{26}y^{18}$

L - 5

(1) 7, 3 (2) 1 (3) 5, 4
(4) 5^6 (5) 1 (6) $\frac{1}{b^7}$
(7) x^5 (8) $\frac{1}{y}$ (9) 3, 6, 6, 2
(10) 5, 3, 1 (11) 5, 2, 2, 4 (12) a
(13) 1 (14) $\frac{1}{b^5}$ (15) x^2
(16) 1 (17) $\frac{1}{y^2}$ (18) y^4

〈풀이〉

※ $x^m \div x^n = \dfrac{x^m}{x^n}$

$$= \frac{\overbrace{x \times x \times x \times \cdots \times x}^{m\text{개}}}{\underbrace{x \times x \times x \times \cdots \times x}_{n\text{개}}}$$

에서 분모, 분자를 약분하면

- $m > n$ 일 때, x^{m-n}
- $m = n$ 일 때, 1
- $m < n$ 일 때, $\dfrac{1}{x^{n-m}}$

즉, $x^m \div x^n$ 의 계산에서는 m과 n의 대소 관계에 따라 그 지수가 달라진다.

(4) $5^8 \div 5^2 = 5^{8-2} = 5^6$

(6) $b^2 \div b^9 = \dfrac{1}{b^{9-2}} = \dfrac{1}{b^7}$

(7) $x^9 \div x^4 = x^{9-4} = x^5$

(8) $y^5 \div y^6 = \dfrac{1}{y^{6-5}} = \dfrac{1}{y}$

※ 나눗셈은 교환법칙이 성립하지 않으므로 왼쪽부터 차례로 계산한다.

(12) $a^8 \div a^4 \div a^3 = a^{8-4} \div a^3$
$= a^4 \div a^3$
$= a^{4-3}$
$= a$

(13) $b^8 \div b^3 \div b^5 = b^{8-3} \div b^5$
$= b^5 \div b^5$
$= 1$

(14) $b^3 \div b^2 \div b^6 = b^{3-2} \div b^6$
$= b \div b^6$
$= \dfrac{1}{b^{6-1}}$
$= \dfrac{1}{b^5}$

(15) $x^6 \div x^3 \div x = x^{6-3} \div x$
$= x^3 \div x$
$= x^{3-1}$
$= x^2$

(16) $x^7 \div x \div x^6 = x^{7-1} \div x^6$
$= x^6 \div x^6$
$= 1$

(17) $y^9 \div y^7 \div y^4 = y^{9-7} \div y^4$
$= y^2 \div y^4$
$= \dfrac{1}{y^{4-2}}$
$= \dfrac{1}{y^2}$

(18) $y^8 \div y \div y^3 = y^{8-1} \div y^3$
$= y^7 \div y^3$
$= y^{7-3}$
$= y^4$

L-6

(1) 4, 1 (2) 6, 9, 3 (3) 15, 15, 7

(4) $\dfrac{1}{a^7}$ (5) x^2 (6) $\dfrac{1}{x^2}$

(7) y^4 (8) 1

(9) 12, 12, 10, 10, 4 (10) $\dfrac{1}{3^3}$

(11) 1 (12) a (13) $\dfrac{1}{x^8}$

(14) 1 (15) y^4 (16) $\dfrac{1}{y^{10}}$

〈풀이〉

※ 괄호가 있는 경우 가장 먼저 괄호를 풀어 준다.

(4) $a^5 \div (a^2)^6 = a^5 \div a^{12} = \dfrac{1}{a^{12-5}} = \dfrac{1}{a^7}$

(5) $(x^5)^2 \div x^8 = x^{10} \div x^8 = x^{10-8} = x^2$

(6) $(x^3)^2 \div (x^2)^4 = x^6 \div x^8 = \dfrac{1}{x^{8-6}} = \dfrac{1}{x^2}$

(7) $(y^6)^2 \div y^8 = y^{12} \div y^8 = y^{12-8} = y^4$

(8) $(y^3)^4 \div (y^4)^3 = y^{12} \div y^{12} = 1$

(10) $3^{13} \div (3^3)^2 \div (3^2)^5 = 3^{13} \div 3^6 \div 3^{10}$
$= 3^{13-6} \div 3^{10}$
$= 3^7 \div 3^{10}$
$= \dfrac{1}{3^{10-7}}$
$= \dfrac{1}{3^3}$

(11) $a^6 \div (a^2)^2 \div a^2 = a^6 \div a^4 \div a^2$
$= a^{6-4} \div a^2$
$= a^2 \div a^2$
$= 1$

(12) $(a^6)^3 \div a^9 \div (a^4)^2 = a^{18} \div a^9 \div a^8$
$= a^{18-9} \div a^8$
$= a^9 \div a^8$
$= a^{9-8}$
$= a$

(13) $(x^5)^3 \div (x^3)^3 \div (x^2)^7 = x^{15} \div x^9 \div x^{14}$
$= x^{15-9} \div x^{14}$
$= x^6 \div x^{14}$
$= \frac{1}{x^{14-6}}$
$= \frac{1}{x^8}$

(14) $x^9 \div x \div (x^4)^2 = x^9 \div x \div x^8$
$= x^{9-1} \div x^8$
$= x^8 \div x^8$
$= 1$

(15) $(y^4)^4 \div (y^2)^3 \div y^6 = y^{16} \div y^6 \div y^6$
$= y^{16-6} \div y^6$
$= y^{10} \div y^6$
$= y^{10-6}$
$= y^4$

(16) $(y^2)^8 \div (y^7)^2 \div (y^3)^4 = y^{16} \div y^{14} \div y^{12}$
$= y^{16-14} \div y^{12}$
$= y^2 \div y^{12}$
$= \frac{1}{y^{12-2}}$
$= \frac{1}{y^{10}}$

L-7

(1) 4, 4 (2) 2, 2, 6, 2 (3) a^5b^{10}
(4) x^6y^9 (5) 5, 5 (6) 3, 3, 3, 6
(7) $\frac{b^8}{a^2}$ (8) $\frac{y^8}{x^{16}}$ (9) 2, 2, 25, 6
(10) $27x^{12}$ (11) 6, 6, b^{12} (12) $16y^8$
(13) $-27x^{15}$ (14) 5, 5, 10, 32 (15) $\frac{49}{x^{16}}$
(16) 3, 3, 12, −64, 12, 64 (17) $\frac{1}{y^{10}}$
(18) $-\frac{x^6}{8}$

〈풀이〉

※ • $(xy)^n = \underbrace{xy \times xy \times \cdots \times xy}_{n\text{개}}$
$= \underbrace{x \times x \times \cdots \times x}_{n\text{개}} \times \underbrace{y \times y \times \cdots \times y}_{n\text{개}}$
$= x^n y^n$

• $\left(\frac{x}{y}\right)^n = \underbrace{\frac{x}{y} \times \frac{x}{y} \times \cdots \times \frac{x}{y}}_{n\text{개}}$
$= \frac{\overbrace{x \times x \times \cdots \times x}^{n\text{개}}}{\underbrace{y \times y \times \cdots \times y}_{n\text{개}}}$
$= \frac{x^n}{y^n}$

(3) $(ab^2)^5 = a^5(b^2)^5 = a^5b^{10}$
(4) $(x^2y^3)^3 = (x^2)^3(y^3)^3 = x^6y^9$
(7) $\left(\frac{b^4}{a}\right)^2 = \frac{(b^4)^2}{a^2} = \frac{b^8}{a^2}$
(8) $\left(\frac{y^2}{x^4}\right)^4 = \frac{(y^2)^4}{(x^4)^4} = \frac{y^8}{x^{16}}$
(10) $(3x^4)^3 = 3^3(x^4)^3 = 27x^{12}$
(11) '−'가 들어 있는 거듭제곱을 간단히 할 때에는 부호부터 결정하는 것이 편리하다.
$(-)^n$ ⇨ $\begin{cases} n\text{이 짝수일 때} : + \\ n\text{이 홀수일 때} : - \end{cases}$
(12) $(-2y^2)^4 = (-2)^4(y^2)^4 = 16y^8$
(13) $(-3x^5)^3 = (-3)^3(x^5)^3 = -27x^{15}$
(15) $\left(\frac{7}{x^8}\right)^2 = \frac{7^2}{(x^8)^2} = \frac{49}{x^{16}}$
(17) $\left(-\frac{1}{y^5}\right)^2 = \frac{(-1)^2}{(y^5)^2} = \frac{1}{y^{10}}$
(18) $\left(-\frac{x^2}{2}\right)^3 = \frac{(x^2)^3}{(-2)^3} = \frac{x^6}{-8} = -\frac{x^6}{8}$

L-8

(1) 2, 2, 2, $a^2b^4c^6$ (2) $x^8y^4z^{16}$
(3) $a^6b^9c^{12}$ (4) $x^{15}y^{10}z^{25}$
(5) 3, 3, 9, 3, 3, $\frac{a^9}{b^6c^3}$ (6) $\frac{x^5y^{10}}{z^{20}}$
(7) $\frac{a^{12}b^8}{c^{20}}$ (8) $\frac{x^4}{y^6z^8}$
(9) 2, 2, 2, $9a^8b^4$ (10) $16x^{18}y^2$
(11) $-32a^5b^{15}$ (12) $16x^4y^{10}$
(13) 4, 4, 4, 4, 12, $\frac{16a^4}{b^{12}}$ (14) $\frac{x^{10}}{36y^4}$
(15) $\frac{b^{20}}{a^8}$ (16) $-\frac{y^3}{27x^6}$

〈풀이〉

(2) $(x^2yz^4)^4=(x^2)^4y^4(z^4)^4=x^8y^4z^{16}$

(3) $(a^2b^3c^4)^3=(a^2)^3(b^3)^3(c^4)^3=a^6b^9c^{12}$

(4) $(x^3y^2z^5)^5=(x^3)^5(y^2)^5(z^5)^5=x^{15}y^{10}z^{25}$

(6) $\left(\frac{xy^2}{z^4}\right)^5=\frac{(xy^2)^5}{(z^4)^5}=\frac{x^5(y^2)^5}{z^{20}}=\frac{x^5y^{10}}{z^{20}}$

(7) $\left(\frac{a^3b^2}{c^5}\right)^4=\frac{(a^3b^2)^4}{(c^5)^4}=\frac{(a^3)^4(b^2)^4}{c^{20}}=\frac{a^{12}b^8}{c^{20}}$

(8) $\left(\frac{x^2}{y^3z^4}\right)^2=\frac{(x^2)^2}{(y^3z^4)^2}=\frac{x^4}{(y^3)^2(z^4)^2}=\frac{x^4}{y^6z^8}$

(10) $(4x^9y)^2=4^2(x^9)^2y^2=16x^{18}y^2$

(11) $(-2ab^3)^5=(-2)^5a^5(b^3)^5=-32a^5b^{15}$

(12) $(-4x^2y^5)^2=(-4)^2(x^2)^2(y^5)^2=16x^4y^{10}$

(14) $\left(\frac{x^5}{6y^2}\right)^2=\frac{(x^5)^2}{(6y^2)^2}=\frac{x^{10}}{6^2(y^2)^2}=\frac{x^{10}}{36y^4}$

(15) $\left(-\frac{b^5}{a^2}\right)^4=\frac{(-b^5)^4}{(a^2)^4}=\frac{(-1)^4(b^5)^4}{a^8}=\frac{b^{20}}{a^8}$

(16) $\left(-\frac{y}{3x^2}\right)^3=\frac{(-y)^3}{(3x^2)^3}=\frac{(-1)^3y^3}{3^3(x^2)^3}=\frac{-y^3}{27x^6}=-\frac{y^3}{27x^6}$

(7) $(a^2)^4\times(b^5)^2=a^{2\times4}\times b^{5\times2}$
$=a^8b^{10}$

(8) $(x^8)^3\times(y^4)^2\times y^3=x^{8\times3}\times y^{4\times2}\times y^3$
$=x^{24}\times y^8\times y^3$
$=x^{24}y^{11}$

(9) $a^{11}\div a^4=a^{11-4}=a^7$

(10) $x^7\div x^2\div x^5=x^{7-2}\div x^5=x^5\div x^5=1$

(11) $(b^3)^2\div b^{12}=b^6\div b^{12}=\frac{1}{b^{12-6}}=\frac{1}{b^6}$

(12) $(y^6)^4\div(y^2)^6\div(y^4)^2=y^{24}\div y^{12}\div y^8$
$=y^{24-12}\div y^8$
$=y^{12}\div y^8$
$=y^{12-8}$
$=y^4$

(13) $(a^3b^4)^4=(a^3)^4(b^4)^4=a^{12}b^{16}$

(14) $\left(-\frac{3}{y^5}\right)^2=\frac{(-3)^2}{(y^5)^2}=\frac{9}{y^{10}}$

(15) $\left(\frac{c^2}{ab^5}\right)^3=\frac{(c^2)^3}{(ab^5)^3}=\frac{c^6}{a^3(b^5)^3}=\frac{c^6}{a^3b^{15}}$

(16) $(2x^3y)^4=2^4(x^3)^4y^4=16x^{12}y^4$

L-9

(1) a^{13} (2) x^{16} (3) a^8b^4
(4) x^9y^{11} (5) a^{42} (6) x^{22}
(7) a^8b^{10} (8) $x^{24}y^{11}$ (9) a^7
(10) 1 (11) $\frac{1}{b^6}$ (12) y^4
(13) $a^{12}b^{16}$ (14) $\frac{9}{y^{10}}$ (15) $\frac{c^6}{a^3b^{15}}$
(16) $16x^{12}y^4$

〈풀이〉

(1) $a^8\times a^5=a^{8+5}=a^{13}$

(2) $x^2\times x^9\times x^5=x^{2+9+5}=x^{16}$

(3) $a^7\times b^4\times a=a^7\times a\times b^4$
$=a^{7+1}\times b^4$
$=a^8b^4$

(4) $x^3\times y^8\times y^3\times x^6=x^3\times x^6\times y^8\times y^3$
$=x^{3+6}\times y^{8+3}$
$=x^9y^{11}$

(5) $(a^7)^6=a^{7\times6}=a^{42}$

(6) $x^4\times(x^9)^2=x^4\times x^{9\times2}$
$=x^4\times x^{18}$
$=x^{22}$

L-10

(1) a^3b^9 (2) $x^7y^4z^7$ (3) a^{17}
(4) $x^{16}y^9$ (5) $\frac{1}{a^3}$ (6) 1
(7) $32a^{15}b^{10}$ (8) $-\frac{27x^9y^3}{z^6}$ (9) $\frac{1}{a^2}$
(10) x^6 (11) $\frac{1}{b^3}$ (12) 1
(13) a^{12} (14) 1 (15) b^3
(16) $\frac{1}{y^2}$

〈풀이〉

(1) $a^2\times b^4\times a\times b^3\times b^2=a^2\times a\times b^4\times b^3\times b^2$
$=a^{2+1}\times b^{4+3+2}$
$=a^3b^9$

(2) $x\times y^3\times z^4\times y\times z^3\times x^6$
$=x\times x^6\times y^3\times y\times z^4\times z^3$
$=x^{1+6}\times y^{3+1}\times z^{4+3}$
$=x^7y^4z^7$

(3) $(a^3)^4\times(a^2)^2\times a=a^{3\times4}\times a^{2\times2}\times a$
$=a^{12}\times a^4\times a$
$=a^{17}$

(4) $(x^7)^2\times(y^2)^3\times x^2\times y^3=x^{7\times2}\times y^{2\times3}\times x^2\times y^3$
$=x^{14}\times y^6\times x^2\times y^3$
$=x^{16}y^9$

(5) $a^9\div a^7\div a^5=a^{9-7}\div a^5$
$=a^2\div a^5$
$=\frac{1}{a^{5-2}}$
$=\frac{1}{a^3}$

(6) $(x^4)^4\div(x^2)^5\div(x^3)^2=x^{16}\div x^{10}\div x^6$
$=x^{16-10}\div x^6$
$=x^6\div x^6$
$=1$

(7) $(2a^3b^2)^5=2^5(a^3)^5(b^2)^5=32a^{15}b^{10}$

(8) $\left(-\frac{3x^3y}{z^2}\right)^3=\frac{(-3x^3y)^3}{(z^2)^3}$
$=\frac{(-3)^3(x^3)^3y^3}{z^6}$
$=\frac{-27x^9y^3}{z^6}$
$=-\frac{27x^9y^3}{z^6}$

(9) $a^2\times a^3\div a^7=a^5\div a^7=\frac{1}{a^2}$

(10) $x^4\div x\times x^3=x^3\times x^3=x^6$

(11) $(b^2)^5\times b^2\div(b^5)^3=b^{10}\times b^2\div b^{15}$
$=b^{12}\div b^{15}$
$=\frac{1}{b^3}$

(12) $(y^3)^2\div(y^2)^4\times y^2=y^6\div y^8\times y^2$
$=\frac{1}{y^2}\times y^2$
$=1$

(13) $a^4\times(a^3\times a^5)=a^4\times a^8=a^{12}$

(14) $x\times(x^3\div x^4)=x\times\frac{1}{x}=1$

(15) $b^8\div(b\times b^4)=b^8\div b^5=b^3$

(16) $y^2\div(y^7\div y^3)=y^2\div y^4=\frac{1}{y^2}$

L - 11

(1) 3, 3, 21
(2) $-30xy$
(3) $-28ab$
(4) $18xy$
(5) 2, 2, 16
(6) $-36x^3y$
(7) $-54a^2b^3$
(8) $8x^4y^5$
(9) a, a, a^5
(10) $-9x^8$
(11) $-20b^{10}$
(12) $42y^7$
(13) 9, 9, 27, 6
(14) $-24x^{11}y^2$
(15) $-56a^4b^8$
(16) $15x^9y^5$

〈풀이〉

※ 단항식의 곱셈에서는 먼저 각 항의 부호만을 계산하여 전체의 부호를 결정한 후 곱셈을 하면 편리하다.

(2) $5x\times(-6y)=5\times x\times(-6)\times y$
$=5\times(-6)\times x\times y$
$=-30xy$

(3) $(-7a)\times4b=(-7)\times a\times4\times b$
$=(-7)\times4\times a\times b$
$=-28ab$

(4) $(-6x)\times(-3y)=(-6)\times x\times(-3)\times y$
$=(-6)\times(-3)\times x\times y$
$=18xy$

(6) $4x^3\times(-9y)=4\times x^3\times(-9)\times y$
$=4\times(-9)\times x^3\times y$
$=-36x^3y$

(7) $(-9a^2)\times6b^3=(-9)\times a^2\times6\times b^3$
$=(-9)\times6\times a^2\times b^3$
$=-54a^2b^3$

(8) $(-2x^4)\times(-4y^5)=(-2)\times x^4\times(-4)\times y^5$
$=(-2)\times(-4)\times x^4\times y^5$
$=8x^4y^5$

(10) $3x^5\times(-3x^3)=3\times x^5\times(-3)\times x^3$
$=3\times(-3)\times x^5\times x^3$
$=-9x^8$

(11) $(-4b^4)\times5b^6=(-4)\times b^4\times5\times b^6$
$=(-4)\times5\times b^4\times b^6$
$=-20b^{10}$

(12) $(-7y^2)\times(-6y^5)=(-7)\times y^2\times(-6)\times y^5$
$=(-7)\times(-6)\times y^2\times y^5$
$=42y^7$

(14) $6x^7\times(-4x^4y^2)=6\times x^7\times(-4)\times x^4\times y^2$
$=6\times(-4)\times x^7\times x^4\times y^2$
$=-24x^{11}y^2$

(15) $(-8a^2b)\times7a^2b^7$
$=(-8)\times a^2\times b\times7\times a^2\times b^7$
$=(-8)\times7\times a^2\times a^2\times b\times b^7$
$=-56a^4b^8$

(16) $(-5x^4y^3)\times(-3x^5y^2)$
$=(-5)\times x^4\times y^3\times(-3)\times x^5\times y^2$
$=(-5)\times(-3)\times x^4\times x^5\times y^3\times y^2$
$=15x^9y^5$

L - 12

(1) 9, 9, 9, 27
(2) $-32x^2y^3$
(3) $25a^8b^2$
(4) $-9x^2y^9$
(5) 4, 4, 4, 12, 5
(6) $45x^9$
(7) $-16b^{11}$
(8) $-72y^{13}$
(9) 6, 6, 6, 7, 5
(10) $-40x^4y^{10}$
(11) $16a^7b^5$
(12) $-16x^8y^2$
(13) 2, 2, 2, 50, 5, 4
(14) $-24x^5y^7$
(15) $8a^8b^5$
(16) $36x^4y^6$

〈풀이〉

(2) $4x^2\times(-2y)^3=4x^2\times(-8y^3)$
$=4\times x^2\times(-8)\times y^3$
$=4\times(-8)\times x^2\times y^3$
$=-32x^2y^3$

(3) $(-a^2)^4\times(5b)^2=a^8\times25b^2$
$=a^8\times25\times b^2$
$=25\times a^8\times b^2$
$=25a^8b^2$

(4) $(-3x)^2\times(-y^3)^3=9x^2\times(-y^9)$
$=9\times x^2\times(-1)\times y^9$
$=9\times(-1)\times x^2\times y^9$
$=-9x^2y^9$

(6) $5x\times(3x^4)^2=5x\times9x^8$
$=5\times x\times9\times x^8$
$=5\times9\times x\times x^8$
$=45x^9$

(7) $(4b^3)^2\times(-b)^5=16b^6\times(-b^5)$
$=16\times b^6\times(-1)\times b^5$
$=16\times(-1)\times b^6\times b^5$
$=-16b^{11}$

(8) $(-2y)^3\times(-3y^5)^2=(-8y^3)\times9y^{10}$
$=(-8)\times y^3\times9\times y^{10}$
$=(-8)\times9\times y^3\times y^{10}$
$=-72y^{13}$

(10) $5x^4y\times(-2y^3)^3=5x^4y\times(-8y^9)$
$=5\times x^4\times y\times(-8)\times y^9$
$=5\times(-8)\times x^4\times y\times y^9$
$=-40x^4y^{10}$

(11) $(-4b^2)^2\times a^7b=16b^4\times a^7b$
$=16\times b^4\times a^7\times b$
$=16\times a^7\times b^4\times b$
$=16a^7b^5$

(12) $(2x^2)^3\times(-2x^2y^2)=8x^6\times(-2x^2y^2)$
$=8\times x^6\times(-2)\times x^2\times y^2$
$=8\times(-2)\times x^6\times x^2\times y^2$
$=-16x^8y^2$

(14) $(-2xy^2)^3\times3x^2y=(-8x^3y^6)\times3x^2y$
$=(-8)\times x^3\times y^6\times3\times x^2\times y$
$=(-8)\times3\times x^3\times x^2\times y^6\times y$
$=-24x^5y^7$

(15) $(ab)^2\times(2a^2b)^3=a^2b^2\times8a^6b^3$
$=a^2\times b^2\times8\times a^6\times b^3$
$=8\times a^2\times a^6\times b^2\times b^3$
$=8a^8b^5$

(16) $(-2xy)^2\times(-3xy^2)^2=4x^2y^2\times9x^2y^4$
$=4\times x^2\times y^2\times9\times x^2\times y^4$
$=4\times9\times x^2\times x^2\times y^2\times y^4$
$=36x^4y^6$

L- 13

(1) $\frac{1}{5}ab$
(2) $-15x^4y^3$
(3) $\frac{3}{2}a^9$
(4) $-24x^9y^6$
(5) $64x^{12}y^6$
(6) $\frac{1}{12}b^{10}$
(7) $20x^{10}y^5$
(8) $-\frac{1}{54}a^{11}b^{14}$
(9) $49b^9$
(10) $-\frac{8}{3}a^6b^7$
(11) $42xy$
(12) $-15x^5y^{17}$
(13) $\frac{1}{2}x^{11}y$
(14) $-\frac{1}{18}x^{19}$
(15) $-\frac{1}{3}ab$
(16) $45x^{10}y^8$

〈풀이〉

(1) $\frac{1}{2}a\times\frac{2}{5}b=\frac{1}{2}\times\frac{2}{5}\times a\times b$
$=\frac{1}{5}ab$

(2) $3x^4\times(-5y^3)=3\times(-5)\times x^4\times y^3=-15x^4y^3$

(3) $(-2a^8)\times\left(-\frac{3}{4}a\right)=(-2)\times\left(-\frac{3}{4}\right)\times a^8\times a$
$=\frac{3}{2}a^9$

(4) $(-4x^2y^5)\times6x^7y=(-4)\times6\times x^2\times x^7\times y^5\times y$
$=-24x^9y^6$

(5) $(-2x^4)^3\times(-2y^2)^3=(-8x^{12})\times(-8y^6)$
$=(-8)\times(-8)\times x^{12}\times y^6$
$=64x^{12}y^6$

(6) $\left(-\frac{1}{3}b^4\right)^2\times\frac{3}{4}b^2=\frac{1}{9}b^8\times\frac{3}{4}b^2$
$=\frac{1}{9}\times\frac{3}{4}\times b^8\times b^2$
$=\frac{1}{12}b^{10}$

(7) $5x^2y^5\times(2x^4)^2=5x^2y^5\times4x^8$
$=5\times4\times x^2\times x^8\times y^5$
$=20x^{10}y^5$

(8) $\left(\frac{1}{4}a^4b\right)^2\times\left(-\frac{2}{3}ab^4\right)^3$
$=\frac{1}{16}a^8b^2\times\left(-\frac{8}{27}a^3b^{12}\right)$
$=\frac{1}{16}\times\left(-\frac{8}{27}\right)\times a^8\times a^3\times b^2\times b^{12}$
$=-\frac{1}{54}a^{11}b^{14}$

(9) $(-7b^5)\times(-7b^4)=(-7)\times(-7)\times b^5\times b^4$
$=49b^9$

(10) $\left(-\frac{2}{3}a^2\right)^3\times9b^7=\left(-\frac{8}{27}a^6\right)\times9b^7$
$=\left(-\frac{8}{27}\right)\times9\times a^6\times b^7$
$=-\frac{8}{3}a^6b^7$

(11) $6x\times7y=6\times7\times x\times y=42xy$

(12) $\left(-\frac{3}{5}x^5y^3\right)\times(5y^7)^2=\left(-\frac{3}{5}x^5y^3\right)\times25y^{14}$
$=\left(-\frac{3}{5}\right)\times25\times x^5\times y^3\times y^{14}$
$=-15x^5y^{17}$

(13) $\frac{5}{4}x^3y\times\frac{2}{5}x^8=\frac{5}{4}\times\frac{2}{5}\times x^3\times x^8\times y$
$=\frac{1}{2}x^{11}y$

(14) $\left(-\frac{2}{3}x^5\right)^2\times\left(-\frac{1}{2}x^3\right)^3=\frac{4}{9}x^{10}\times\left(-\frac{1}{8}x^9\right)$
$=\frac{4}{9}\times\left(-\frac{1}{8}\right)\times x^{10}\times x^9$
$=-\frac{1}{18}x^{19}$

(15) $6a\times\left(-\frac{1}{18}b\right)=6\times\left(-\frac{1}{18}\right)\times a\times b$
$=-\frac{1}{3}ab$

(16) $(-3x^4y^2)^2\times5x^2y^4=9x^8y^4\times5x^2y^4$
$=9\times5\times x^8\times x^2\times y^4\times y^4$
$=45x^{10}y^8$

L - 14

(1) 4, 4, 6
(2) $-7x^6$
(3) $-8b^3$
(4) $2y^5$
(5) 5, 5, 5, 4
(6) $-\frac{x}{9}$
(7) $\frac{4}{b^2}$
(8) $\frac{1}{3y^7}$
(9) a, a, b^4
(10) $-7xy^6$
(11) $-9a^4$
(12) $5x^2y^3$
(13) 7, 7, $-\frac{8a^3}{b^5}$
(14) $\frac{y^4}{3}$

〈풀이〉

※ 단항식의 나눗셈은 분수 꼴로 고쳐 계산하거나 나누는 단항식의 역수를 곱하는 두 가지 방법으로 계산할 수 있고 그 결과는 같다.

(1) 〈다른 풀이〉 $24a^5\div4a^3=24a^5\times\frac{1}{4a^3}$
$=24\times\frac{1}{4}\times a^5\times\frac{1}{a^3}$
$=6a^2$

(2) $42x^9\div(-6x^3)=\frac{42x^9}{-6x^3}$
$=\frac{42\times x^9}{(-6)\times x^3}$
$=-7x^6$

(3) $(-24b^5)\div3b^2=\frac{-24b^5}{3b^2}$
$=\frac{(-24)\times b^5}{3\times b^2}$
$=-8b^3$

(4) $(-14y^6)\div(-7y)=\frac{-14y^6}{-7y}$
$=\frac{(-14)\times y^6}{(-7)\times y}$
$=2y^5$

(5) 〈다른 풀이〉
$40a^5\div(-8a^9)=40a^5\times\frac{1}{-8a^9}$
$=40\times\left(-\frac{1}{8}\right)\times a^5\times\frac{1}{a^9}$
$=-\frac{5}{a^4}$

(6) $(-2x^5)\div 18x^4=\frac{-2x^5}{18x^4}=\frac{(-2)\times x^5}{18\times x^4}=-\frac{x}{9}$

(7) $(-20b^2)\div(-5b^4)=\frac{-20b^2}{-5b^4}$

$=\frac{(-20)\times b^2}{(-5)\times b^4}$

$=\frac{4}{b^2}$

(8) $9y^2\div 27y^9=\frac{9y^2}{27y^9}=\frac{9\times y^2}{27\times y^9}=\frac{1}{3y^7}$

(9) 〈다른 풀이〉 $54ab^4\div 6a=54ab^4\times\frac{1}{6a}$

$=54\times\frac{1}{6}\times ab^4\times\frac{1}{a}$

$=9b^4$

(10) $14xy^8\div(-2y^2)=\frac{14xy^8}{-2y^2}$

$=\frac{14\times x\times y^8}{(-2)\times y^2}$

$=-7xy^6$

(11) $(-36a^6b^3)\div 4a^2b^3=\frac{-36a^6b^3}{4a^2b^3}$

$=\frac{(-36)\times a^6\times b^3}{4\times a^2\times b^3}$

$=-9a^4$

(12) $(-15x^7y^6)\div(-3x^5y^3)=\frac{-15x^7y^6}{-3x^5y^3}$

$=\frac{(-15)\times x^7\times y^6}{(-3)\times x^5\times y^3}$

$=5x^2y^3$

(13) 〈다른 풀이〉

$(-40a^3b^2)\div 5b^7=(-40a^3b^2)\times\frac{1}{5b^7}$

$=(-40)\times\frac{1}{5}\times a^3b^2\times\frac{1}{b^7}$

$=-\frac{8a^3}{b^5}$

(14) $6x^4y^4\div 18x^4=\frac{6x^4y^4}{18x^4}$

$=\frac{6\times x^4\times y^4}{18\times x^4}$

$=\frac{y^4}{3}$

(15) $(-18x^3y^5)\div(-9x^4y^8)=\frac{-18x^3y^5}{-9x^4y^8}$

$=\frac{(-18)\times x^3\times y^5}{(-9)\times x^4\times y^8}$

$=\frac{2}{xy^3}$

(16) $8x^8y^3\div(-32x^4y^8)$

$=\frac{8x^8y^3}{-32x^4y^8}$

L - 15

(1) 4, 4, 4, a (2) $-7x^3$

(3) $9b^4$ (4) $-25y^3$

(5) $\frac{8}{a^4}$ (6) $-\frac{x^6}{5}$

(7) $-\frac{3}{b^5}$ (8) $\frac{1}{2y^3}$

(9) 4, 4, 4, 5 (10) $-x^7y^6$

(11) $-4ab$ (12) $9x^2$

(13) $\frac{9b^2}{a^3}$ (14) $-\frac{9}{x^6y^3}$

(15) $-\frac{ab^3}{8}$ (16) $\frac{8x^2}{y^2}$

〈풀이〉

(2) $56x^9\div(-2x^2)^3=56x^9\div(-8x^6)$

$=\frac{56x^9}{-8x^6}$

$=\frac{56\times x^9}{(-8)\times x^6}$

$=-7x^3$

(3) $(-6b^5)^2\div(2b^3)^2=36b^{10}\div 4b^6$

$=\frac{36b^{10}}{4b^6}$

$=\frac{36\times b^{10}}{4\times b^6}$

$=9b^4$

(4) $(-5y^4)^2\div(-y)^5=25y^8\div(-y^5)$

$=\frac{25y^8}{-y^5}$

$=\frac{25\times y^8}{(-1)\times y^5}$

$=-25y^3$

(5) $(-4a)^2 \div 2a^6 = 16a^2 \div 2a^6$

$= \frac{16a^2}{2a^6}$

$= \frac{16 \times a^2}{2 \times a^6}$

$= \frac{8}{a^4}$

(6) $(-5x^8) \div (5x)^2 = (-5x^8) \div 25x^2$

$= \frac{-5x^8}{25x^2}$

$= \frac{(-5) \times x^8}{25 \times x^2}$

$= -\frac{x^6}{5}$

(7) $(-3b)^3 \div (-3b^4)^2 = (-27b^3) \div 9b^8$

$= \frac{-27b^3}{9b^8}$

$= \frac{(-27) \times b^3}{9 \times b^8}$

$= -\frac{3}{b^5}$

(8) $(2y^3)^3 \div (2y^3)^4 = 8y^9 \div 16y^{12}$

$= \frac{8y^9}{16y^{12}}$

$= \frac{8 \times y^9}{16 \times y^{12}}$

$= \frac{1}{2y^3}$

(10) $(-2x^3y^2)^3 \div 8x^2 = (-8x^9y^6) \div 8x^2$

$= \frac{-8x^9y^6}{8x^2}$

$= \frac{(-8) \times x^9 \times y^6}{8 \times x^2}$

$= -x^7y^6$

(11) $(6ab)^2 \div (-9ab) = 36a^2b^2 \div (-9ab)$

$= \frac{36a^2b^2}{-9ab}$

$= \frac{36 \times a^2 \times b^2}{(-9) \times a \times b}$

$= -4ab$

(12) $(-3x^4y)^2 \div (-x^3y)^2 = 9x^8y^2 \div x^6y^2$

$= \frac{9x^8y^2}{x^6y^2}$

$= \frac{9 \times x^8 \times y^2}{x^6 \times y^2}$

$= 9x^2$

(13) $(-6a^2b)^2 \div 4a^7 = 36a^4b^2 \div 4a^7$

$= \frac{36a^4b^2}{4a^7}$

$= \frac{36 \times a^4 \times b^2}{4 \times a^7}$

$= \frac{9b^2}{a^3}$

(14) $(3x^3)^2 \div (-x^4y)^3 = 9x^6 \div (-x^{12}y^3)$

$= \frac{9x^6}{-x^{12}y^3}$

$= \frac{9 \times x^6}{(-1) \times x^{12} \times y^3}$

$= -\frac{9}{x^6y^3}$

(15) $(-2a^3b^7) \div (-4ab^2)^2 = (-2a^3b^7) \div 16a^2b^4$

$= \frac{-2a^3b^7}{16a^2b^4}$

$= \frac{(-2) \times a^3 \times b^7}{16 \times a^2 \times b^4}$

$= -\frac{ab^3}{8}$

(16) $(2x^2y^2)^3 \div (x^2y^4)^2 = 8x^6y^6 \div x^4y^8$

$= \frac{8x^6y^6}{x^4y^8}$

$= \frac{8 \times x^6 \times y^6}{x^4 \times y^8}$

$= \frac{8x^2}{y^2}$

L - 16

(1) $\frac{3}{4}$, a^2, $-6a^2$

(2) $-2b^2$

(3) $\frac{6}{5}$, a^4, $\frac{12b^4}{a^3}$

(4) $\frac{5a^3b^4}{12}$

(5) $-\frac{2}{9}$, a^7b^5, $-\frac{2b^2}{3}$

(6) $\frac{4x^4}{9y^5}$

(7) $\frac{1}{8ab^2}$

(8) 4, a^2, $-48a^4b$

(9) $-\frac{y^2}{12x}$

(10) $-4a^3$

〈풀이〉

※ 나누는 단항식에 분수가 포함되어 있으면 역수를 곱하여 계산하는 방법을 이용한다.

(2) $\frac{3}{2}b^9 \div \left(-\frac{3}{4}b^7\right) = \frac{3}{2}b^9 \div \left(-\frac{3b^7}{4}\right)$

$= \frac{3}{2}b^9 \times \left(-\frac{4}{3b^7}\right)$

$= \frac{3}{2} \times \left(-\frac{4}{3}\right) \times b^9 \times \frac{1}{b^7}$

$= -2b^2$

(4) $\left(-\frac{5}{8}a^3b^8\right) \div \left(-\frac{3}{2}b^4\right)$

$= \left(-\frac{5}{8}a^3b^8\right) \div \left(-\frac{3b^4}{2}\right)$

$= \left(-\frac{5}{8}a^3b^8\right) \times \left(-\frac{2}{3b^4}\right)$

$= \left(-\frac{5}{8}\right) \times \left(-\frac{2}{3}\right) \times a^3b^8 \times \frac{1}{b^4}$

$= \frac{5a^3b^4}{12}$

(6) $\left(-\frac{8}{3}x^5y\right) \div (-6xy^6)$

$= \left(-\frac{8}{3}x^5y\right) \times \left(-\frac{1}{6xy^6}\right)$

$= \left(-\frac{8}{3}\right) \times \left(-\frac{1}{6}\right) \times x^5y \times \frac{1}{xy^6}$

$= \frac{4x^4}{9y^5}$

(7) $\frac{9}{20}a^2b \div \frac{18}{5}a^3b^3 = \frac{9}{20}a^2b \div \frac{18a^3b^3}{5}$

$= \frac{9}{20}a^2b \times \frac{5}{18a^3b^3}$

$= \frac{9}{20} \times \frac{5}{18} \times a^2b \times \frac{1}{a^3b^3}$

$= \frac{1}{8ab^2}$

(9) $\left(\frac{1}{3}xy\right)^2 \div \left(-\frac{4}{3}x^3\right)$

$= \frac{1}{9}x^2y^2 \div \left(-\frac{4x^3}{3}\right)$

$= \frac{1}{9}x^2y^2 \times \left(-\frac{3}{4x^3}\right)$

$= \frac{1}{9} \times \left(-\frac{3}{4}\right) \times x^2y^2 \times \frac{1}{x^3}$

$= -\frac{y^2}{12x}$

(10) $(-ab^2)^3 \div \left(\frac{1}{2}b^3\right)^2 = (-a^3b^6) \div \frac{1}{4}b^6$

$= (-a^3b^6) \times \frac{4}{b^6}$

$= (-1) \times 4 \times a^3b^6 \times \frac{1}{b^6}$

$= -4a^3$

L - 17

(1) $-8a$

(2) $\frac{1}{3y^5}$

(3) $-4b^5$

(4) $-\frac{y^3}{9x^2}$

(5) $-\frac{2}{3a}$

(6) $\frac{9x^2}{y^4}$

(7) $3a^2b$

(8) $\frac{6}{5y}$

(9) $-\frac{3}{a^5}$

(10) $\frac{32y^7}{x^2}$

(11) $-\frac{x^2y^4}{4}$

(12) $\frac{1}{8b^6}$

(13) $-10y^3$

(14) $5a^4b^8$

〈풀이〉

(1) $(-56a^7) \div 7a^6 = \frac{-56a^7}{7a^6}$

$= \frac{(-56) \times a^7}{7 \times a^6}$

$= -8a$

(2) $(-8x^6) \div (-24x^6y^5) = \frac{-8x^6}{-24x^6y^5}$

$= \frac{(-8) \times x^6}{(-24) \times x^6 \times y^5}$

$= \frac{1}{3y^5}$

(3) $(2b^2)^3 \div (-2b) = 8b^6 \div (-2b)$

$= \frac{8b^6}{-2b}$

$= \frac{8 \times b^6}{(-2) \times b}$

$= -4b^5$

(4) $(-x^2y^3)^3 \div (-3x^4y^3)^2 = (-x^6y^9) \div 9x^8y^6$

$= \frac{-x^6y^9}{9x^8y^6}$

$= \frac{(-1)\times x^6 \times y^9}{9\times x^8 \times y^6}$

$= -\frac{y^3}{9x^2}$

(5) $\left(-\frac{3}{4}b^3\right) \div \frac{9}{8}ab^3 = \left(-\frac{3}{4}b^3\right) \times \left(\frac{8}{9ab^3}\right)$

$= \left(-\frac{3}{4}\right) \times \frac{8}{9} \times b^3 \times \frac{1}{ab^3}$

$= -\frac{2}{3a}$

(6) $(x^2y)^2 \div \left(\frac{1}{3}xy^3\right)^2 = x^4y^2 \div \frac{1}{9}x^2y^6$

$= x^4y^2 \times \frac{9}{x^2y^6}$

$= 9\times x^4y^2 \times \frac{1}{x^2y^6}$

$= \frac{9x^2}{y^4}$

(7) $12a^2b^5 \div (-2b^2)^2 = 12a^2b^5 \div 4b^4$

$= \frac{12a^2b^5}{4b^4}$

$= \frac{12\times a^2 \times b^5}{4\times b^4}$

$= 3a^2b$

(8) $\left(-\frac{4}{5}y^5\right) \div \left(-\frac{2}{3}y^6\right) = \left(-\frac{4}{5}y^5\right) \times \left(-\frac{3}{2y^6}\right)$

$= \left(-\frac{4}{5}\right) \times \left(-\frac{3}{2}\right) \times y^5 \times \frac{1}{y^6}$

$= \frac{6}{5y}$

(9) $(-15a^4) \div 5a^9 = \frac{-15a^4}{5a^9}$

$= \frac{(-15)\times a^4}{5\times a^9}$

$= -\frac{3}{a^5}$

(10) $(2x^2y^5)^2 \div \left(\frac{1}{2}x^2y\right)^3 = 4x^4y^{10} \div \frac{1}{8}x^6y^3$

$= 4x^4y^{10} \times \frac{8}{x^6y^3}$

$= 4\times 8 \times x^4y^{10} \times \frac{1}{x^6y^3}$

$= \frac{32y^7}{x^2}$

(11) $\left(-\frac{3}{10}x^6y^9\right) \div \frac{6}{5}x^4y^5$

$= \left(-\frac{3}{10}x^6y^9\right) \times \frac{5}{6x^4y^5}$

$= \left(-\frac{3}{10}\right) \times \frac{5}{6} \times x^6y^9 \times \frac{1}{x^4y^5}$

$= -\frac{x^2y^4}{4}$

(12) $(2b^2)^3 \div (4b^4)^3 = 8b^6 \div 64b^{12}$

$= \frac{8b^6}{64b^{12}}$

$= \frac{8\times b^6}{64\times b^{12}}$

$= \frac{1}{8b^6}$

(13) $(5xy^2)^2 \div \left(-\frac{5}{2}x^2y\right)$

$= 25x^2y^4 \div \left(-\frac{5}{2}x^2y\right)$

$= 25x^2y^4 \times \left(-\frac{2}{5x^2y}\right)$

$= 25\times \left(-\frac{2}{5}\right) \times x^2y^4 \times \frac{1}{x^2y}$

$= -10y^3$

(14) $(-30a^8b^9) \div (-6a^4b) = \frac{-30a^8b^9}{-6a^4b}$

$= \frac{(-30)\times a^8 \times b^9}{(-6)\times a^4 \times b}$

$= 5a^4b^8$

L - 18

(1) $36a^5b^2$

(2) $-\frac{3a^3b^4}{20}$

(3) $-4y$

(4) x^3y^3

(5) $\frac{6x^5}{y}$

(6) $-6ab^2$

(7) $-\frac{y^2}{5x}$

(8) $\frac{1}{a^3b^4}$

(9) $-\frac{2x^3}{y^7}$

(10) $-14b^2$

〈풀이〉

※ $A\times B\times C=ABC$

$A\times B\div C=A\times B\times\frac{1}{C}=\frac{AB}{C}$

$A\div B\times C=A\times\frac{1}{B}\times C=\frac{AC}{B}$

$A\div B\div C=A\times\frac{1}{B}\times\frac{1}{C}=\frac{A}{BC}$

(1) $6a^2b\times3a^3\times2b$
$=6\times3\times2\times a^2b\times a^3\times b$
$=36a^5b^2$
〈다른 풀이〉
혼합 계산을 할 때에는 앞에서부터 순서대로 계산해도 된다.
$6a^2b\times3a^3\times2b=18a^5b\times2b$
$=36a^5b^2$

(2) $2a^2\times\frac{3}{4}ab^3\times\left(-\frac{1}{10}b\right)$
$=2\times\frac{3}{4}\times\left(-\frac{1}{10}\right)\times a^2\times ab^3\times b$
$=-\frac{3a^3b^4}{20}$

(3) $3xy\times(-8y)\div6xy$
$=3xy\times(-8y)\times\frac{1}{6xy}$
$=3\times(-8)\times\frac{1}{6}\times xy\times y\times\frac{1}{xy}$
$=-4y$
〈다른 풀이〉
$3xy\times(-8y)\div6xy=(-24xy^2)\div6xy$
$=\frac{-24xy^2}{6xy}$
$=-4y$

(4) $3x^3y^2\times\frac{2}{5}xy^4\div\frac{6}{5}xy^3$
$=3x^3y^2\times\frac{2}{5}xy^4\times\frac{5}{6xy^3}$
$=3\times\frac{2}{5}\times\frac{5}{6}\times x^3y^2\times xy^4\times\frac{1}{xy^3}$
$=x^3y^3$

(5) $(-9x^2y)\div3xy^3\times(-2x^4y)$
$=-9x^2y\times\frac{1}{3xy^3}\times(-2x^4y)$
$=(-9)\times\frac{1}{3}\times(-2)\times x^2y\times\frac{1}{xy^3}\times x^4y$
$=\frac{6x^5}{y}$
〈다른 풀이〉
$(-9x^2y)\div3xy^3\times(-2x^4y)$
$=\frac{-9x^2y}{3xy^3}\times(-2x^4y)$
$=\frac{-3x}{y^2}\times(-2x^4y)$
$=\frac{6x^5}{y}$

(6) $(-2ab)^3\div4a^4b^2\times3a^2b$
$=(-8a^3b^3)\div4a^4b^2\times3a^2b$
$=(-8a^3b^3)\times\frac{1}{4a^4b^2}\times3a^2b$
$=(-8)\times\frac{1}{4}\times3\times a^3b^3\times\frac{1}{a^4b^2}\times a^2b$
$=-6ab^2$

(7) $3x^2y\div(-10x^3y)\times\frac{2}{3}y^2$
$=3x^2y\times\left(-\frac{1}{10x^3y}\right)\times\frac{2}{3}y^2$
$=3\times\left(-\frac{1}{10}\right)\times\frac{2}{3}\times x^2y\times\frac{1}{x^3y}\times y^2$
$=-\frac{y^2}{5x}$

(8) $6a^3b\div2a^2b^3\div3a^4b^2$
$=6a^3b\times\frac{1}{2a^2b^3}\times\frac{1}{3a^4b^2}$
$=6\times\frac{1}{2}\times\frac{1}{3}\times a^3b\times\frac{1}{a^2b^3}\times\frac{1}{a^4b^2}$
$=\frac{1}{a^3b^4}$
〈다른 풀이〉
$6a^3b\div2a^2b^3\div3a^4b^2$
$=\frac{6a^3b}{2a^2b^3}\div3a^4b^2$
$=\frac{3a}{b^2}\times\frac{1}{3a^4b^2}$
$=\frac{1}{a^3b^4}$

(9) $50x^5y^2\div(5xy^3)^2\div(-y)^3$
$=50x^5y^2\div25x^2y^6\div(-y^3)$
$=50x^5y^2\times\frac{1}{25x^2y^6}\times\left(-\frac{1}{y^3}\right)$
$=50\times\frac{1}{25}\times(-1)\times x^5y^2\times\frac{1}{x^2y^6}\times\frac{1}{y^3}$
$=-\frac{2x^3}{y^7}$

(10) $(-12a^2b^6)\div(-2a)\div\left(-\frac{3}{7}ab^4\right)$

$=(-12a^2b^6)\times\left(-\frac{1}{2a}\right)\times\left(-\frac{7}{3ab^4}\right)$

$=(-12)\times\left(-\frac{1}{2}\right)\times\left(-\frac{7}{3}\right)\times a^2b^6\times\frac{1}{a}\times\frac{1}{ab^4}$

$=-14b^2$

L - 19

(1) $-30x^3y^6$ (2) $\frac{a}{50}$

(3) $2a^3b^6$ (4) -16

(5) $-8a^9b^7$ (6) $-2a^6b$

(7) $\frac{5a^4b^2}{4}$ (8) 1

(9) $-\frac{2x}{5y}$ (10) $\frac{3y}{x}$

〈풀이〉

(1) $3xy^2\times(-5y^3)\times2x^2y$

$=3\times(-5)\times2\times xy^2\times y^3\times x^2y$

$=-30x^3y^6$

(2) $a^2b\times\frac{1}{5}ab^2\div10a^2b^3$

$=a^2b\times\frac{1}{5}ab^2\times\frac{1}{10a^2b^3}$

$=\frac{1}{5}\times\frac{1}{10}\times a^2b\times ab^2\times\frac{1}{a^2b^3}$

$=\frac{a}{50}$

(3) $(-5a^2b)\div(-10ab)\times(-2ab^3)^2$

$=(-5a^2b)\div(-10ab)\times4a^2b^6$

$=(-5a^2b)\times\left(-\frac{1}{10ab}\right)\times4a^2b^6$

$=(-5)\times\left(-\frac{1}{10}\right)\times4\times a^2b\times\frac{1}{ab}\times a^2b^6$

$=2a^3b^6$

(4) $12x^2y\div\left(-\frac{3}{4}y\right)\div(-x)^2$

$=12x^2y\div\left(-\frac{3}{4}y\right)\div x^2$

$=12x^2y\times\left(-\frac{4}{3y}\right)\times\frac{1}{x^2}$

$=12\times\left(-\frac{4}{3}\right)\times x^2y\times\frac{1}{y}\times\frac{1}{x^2}$

$=-16$

(5) $(-a^2b)^3\times2a^3b^2\times(-2b)^2$

$=(-a^6b^3)\times2a^3b^2\times4b^2$

$=(-1)\times2\times4\times a^6b^3\times a^3b^2\times b^2$

$=-8a^9b^7$

(6) $6a^9b^2\div(-3a^3)\div b$

$=6a^9b^2\times\left(-\frac{1}{3a^3}\right)\times\frac{1}{b}$

$=6\times\left(-\frac{1}{3}\right)\times a^9b^2\times\frac{1}{a^3}\times\frac{1}{b}$

$=-2a^6b$

(7) $3a^2b^4\div\left(-\frac{3}{5}b^2\right)\times\left(-\frac{1}{4}a^2\right)$

$=3a^2b^4\times\left(-\frac{5}{3b^2}\right)\times\left(-\frac{1}{4}a^2\right)$

$=3\times\left(-\frac{5}{3}\right)\times\left(-\frac{1}{4}\right)\times a^2b^4\times\frac{1}{b^2}\times a^2$

$=\frac{5a^4b^2}{4}$

(8) $8x^2y\div\frac{9}{2}x^4y^3\times\left(-\frac{3}{4}xy\right)^2$

$=8x^2y\div\frac{9}{2}x^4y^3\times\frac{9}{16}x^2y^2$

$=8x^2y\times\frac{2}{9x^4y^3}\times\frac{9}{16}x^2y^2$

$=8\times\frac{2}{9}\times\frac{9}{16}\times x^2y\times\frac{1}{x^4y^3}\times x^2y^2$

$=1$

(9) $(-3xy^2)^2\times\frac{2}{3}x^2\div(-15x^3y^5)$

$=9x^2y^4\times\frac{2}{3}x^2\div(-15x^3y^5)$

$=9x^2y^4\times\frac{2}{3}x^2\times\left(-\frac{1}{15x^3y^5}\right)$

$=9\times\frac{2}{3}\times\left(-\frac{1}{15}\right)\times x^2y^4\times x^2\times\frac{1}{x^3y^5}$

$=-\frac{2x}{5y}$

(10) $\frac{1}{2}x^3y^2\times(2xy^3)^2\div\frac{2}{3}x^6y^7$

$=\frac{1}{2}x^3y^2\times4x^2y^6\div\frac{2}{3}x^6y^7$

$=\frac{1}{2}x^3y^2\times4x^2y^6\times\frac{3}{2x^6y^7}$

$=\frac{1}{2}\times4\times\frac{3}{2}\times x^3y^2\times x^2y^6\times\frac{1}{x^6y^7}$

$=\frac{3y}{x}$

L - 20

(1) $-6ab$ (2) $\frac{y^4}{2}$

(3) $15x^4y^2$ (4) $-a^3b^6$

(5) $-10x$ (6) $-\frac{5a^5b^6}{4}$

(7) $-\frac{y^3}{2x^3}$ (8) $4a^8b$

(9) $\frac{1}{x^2y^3}$ (10) $18a^4b^6$

〈풀이〉

(1) $(-16a^2b)\times 3b\div 8ab$

$=(-16a^2b)\times 3b\times\frac{1}{8ab}$

$=(-16)\times 3\times\frac{1}{8}\times a^2b\times b\times\frac{1}{ab}$

$=-6ab$

(2) $18x^2y^5\div(-2x)^2\div 9y$

$=18x^2y^5\div 4x^2\div 9y$

$=18x^2y^5\times\frac{1}{4x^2}\times\frac{1}{9y}$

$=18\times\frac{1}{4}\times\frac{1}{9}\times x^2y^5\times\frac{1}{x^2}\times\frac{1}{y}$

$=\frac{y^4}{2}$

〈다른 풀이〉

$18x^2y^5\div(-2x)^2\div 9y=18x^2y^5\div 4x^2\div 9y$

$=\frac{9y^5}{2}\times\frac{1}{9y}$

$=\frac{y^4}{2}$

(3) $9x^2y\times 5x\times\frac{1}{3}xy$

$=9\times 5\times\frac{1}{3}\times x^2y\times x\times xy$

$=15x^4y^2$

(4) $(-a^2b^3)^2\div\left(-\frac{1}{2}ab\right)^2\times\left(-\frac{1}{4}ab^2\right)$

$=a^4b^6\div\frac{1}{4}a^2b^2\times\left(-\frac{1}{4}ab^2\right)$

$=a^4b^6\times\frac{4}{a^2b^2}\times\left(-\frac{1}{4}ab^2\right)$

$=4\times\left(-\frac{1}{4}\right)\times a^4b^6\times\frac{1}{a^2b^2}\times ab^2$

$=-a^3b^6$

(5) $5x^2y\div(-3xy^2)\times 6y$

$=5x^2y\times\left(-\frac{1}{3xy^2}\right)\times 6y$

$=5\times\left(-\frac{1}{3}\right)\times 6\times x^2y\times\frac{1}{xy^2}\times y$

$=-10x$

(6) $\left(\frac{1}{2}ab\right)^2\times(-5a^3)\times(-b)^4$

$=\frac{1}{4}a^2b^2\times(-5a^3)\times b^4$

$=\frac{1}{4}\times(-5)\times a^2b^2\times a^3\times b^4$

$=-\frac{5a^5b^6}{4}$

(7) $(2xy^2)^2\times\frac{1}{8}xy^2\div(-x^2y)^3$

$=4x^2y^4\times\frac{1}{8}xy^2\div(-x^6y^3)$

$=4x^2y^4\times\frac{1}{8}xy^2\times\left(-\frac{1}{x^6y^3}\right)$

$=4\times\frac{1}{8}\times(-1)\times x^2y^4\times xy^2\times\frac{1}{x^6y^3}$

$=-\frac{y^3}{2x^3}$

(8) $(-2ab)^3\times 3a^5\div(-6b^2)$

$=(-8a^3b^3)\times 3a^5\div(-6b^2)$

$=(-8a^3b^3)\times 3a^5\times\left(-\frac{1}{6b^2}\right)$

$=(-8)\times 3\times\left(-\frac{1}{6}\right)\times a^3b^3\times a^5\times\frac{1}{b^2}$

$=4a^8b$

(9) $(-4x^2y^3)\div\frac{1}{3}x^3y^2\div(-12xy^4)$

$=(-4x^2y^3)\times\frac{3}{x^3y^2}\times\left(-\frac{1}{12xy^4}\right)$

$=(-4)\times 3\times\left(-\frac{1}{12}\right)\times x^2y^3\times\frac{1}{x^3y^2}\times\frac{1}{xy^4}$

$=\frac{1}{x^2y^3}$

(10) $8a^4b\div\left(\frac{2a^3}{3b}\right)^2\times(a^2b)^3$

$=8a^4b\div\frac{4a^6}{9b^2}\times a^6b^3=8a^4b\times\frac{9b^2}{4a^6}\times a^6b^3$

$=8\times\frac{9}{4}\times a^4b\times\frac{b^2}{a^6}\times a^6b^3$

$=18a^4b^6$

L - 21

(1) $28x^3y^2$
(2) $-27a^{13}b^{13}$
(3) $-\frac{x^2y}{3}$
(4) $7a^2b^3$
(5) $\frac{1}{8x^4y^3}$
(6) $-\frac{6}{a^2}$
(7) $\frac{2a^4b^7}{9}$
(8) $-2x^3y^2$
(9) $2ab$
(10) $-\frac{x}{12}$
(11) $\frac{2b^6}{a^2}$
(12) $2y$

〈풀이〉

(2) $(a^2b^5)^2\times(-3a^3b)^3=a^4b^{10}\times(-27a^9b^3)$
$=-27a^{13}b^{13}$

(4) $(-63a^7b^6)\div(-9a^5b^3)=\frac{-63a^7b^6}{-9a^5b^3}$
$=7a^2b^3$

(5) $2x^2y\div(4x^3y^2)^2=2x^2y\div16x^6y^4$
$=\frac{2x^2y}{16x^6y^4}$
$=\frac{1}{8x^4y^3}$

(6) $\frac{9}{2}a^3\div\left(-\frac{3}{4}a^5\right)=\frac{9}{2}a^3\times\left(-\frac{4}{3a^5}\right)=-\frac{6}{a^2}$

(7) $6ab\times\left(-\frac{1}{3}a\right)^3\times(-b^2)^3$
$=6ab\times\left(-\frac{1}{27}a^3\right)\times(-b^6)$
$=\frac{2a^4b^7}{9}$

(8) $(-4xy^2)\times3x^3y\div6xy$
$=(-4xy^2)\times3x^3y\times\frac{1}{6xy}$
$=-2x^3y^2$

(9) $\frac{1}{8}b^2\times12a^2b\div\frac{3}{4}ab^2=\frac{1}{8}b^2\times12a^2b\times\frac{4}{3ab^2}$
$=2ab$

(10) $\frac{2}{3}xy^2\div(-2xy)^3\times x^3y$
$=\frac{2}{3}xy^2\div(-8x^3y^3)\times x^3y$
$=\frac{2}{3}xy^2\times\left(-\frac{1}{8x^3y^3}\right)\times x^3y$

(11) $(-3a^2b^3)\div\left(-\frac{3a^3}{b}\right)^2\times(-6a^2b)$
$=(-3a^2b^3)\div\frac{9a^6}{b^2}\times(-6a^2b)$
$=(-3a^2b^3)\times\frac{b^2}{9a^6}\times(-6a^2b)$
$=\frac{2b^6}{a^2}$

(12) $(-6xy)^2\div9x^2\div2y$
$=36x^2y^2\div9x^2\div2y$
$=36x^2y^2\times\frac{1}{9x^2}\times\frac{1}{2y}$
$=2y$

L - 22

(1) $-\frac{8a^2}{b^8}$
(2) $12x^5y^3$
(3) $3a^2b$
(4) $\frac{xy}{5}$
(5) $-\frac{a}{4}$
(6) $-2x^4y^5$
(7) $36x^2y^6$
(8) $-\frac{12b^3}{a^2}$
(9) $\frac{y^{11}z^3}{27x^2}$
(10) $-8b^2$
(11) $\frac{x^6y^4}{4}$
(12) $-\frac{4a^{12}b}{5}$

〈풀이〉

(1) $(-2a^2)^3\div(a^2b^4)^2=(-8a^6)\div a^4b^8$
$=\frac{-8a^6}{a^4b^8}$
$=-\frac{8a^2}{b^8}$

(2) $3x^2\times4xy\times(-xy)^2=3x^2\times4xy\times x^2y^2$
$=12x^5y^3$

(4) $4x^2y^2\div10x^4y\times\frac{1}{2}x^3$
$=4x^2y^2\times\frac{1}{10x^4y}\times\frac{1}{2}x^3$
$=\frac{xy}{5}$

(5) $\left(-\frac{1}{2}a^2b\right)^2 \div (-a^3b^2)$

$=\frac{1}{4}a^4b^2 \div (-a^3b^2)$

$=\frac{1}{4}a^4b^2 \times \left(-\frac{1}{a^3b^2}\right)$

$=-\frac{a}{4}$

(6) $8x^4y^3 \times (-xy)^2 \div (-4x^2)$

$=8x^4y^3 \times x^2y^2 \div (-4x^2)$

$=8x^4y^3 \times x^2y^2 \times \left(-\frac{1}{4x^2}\right)$

$=-2x^4y^5$

(7) $(-3xy)^2 \times 4y^4 = 9x^2y^2 \times 4y^4 = 36x^2y^6$

(8) $2a^3b^4 \div \left(-\frac{1}{2}a^2b\right)^3 \div \frac{4}{3ab^2}$

$=2a^3b^4 \div \left(-\frac{1}{8}a^6b^3\right) \div \frac{4}{3ab^2}$

$=2a^3b^4 \times \left(-\frac{8}{a^6b^3}\right) \times \frac{3ab^2}{4}$

$=-\frac{12b^3}{a^2}$

(9) $(xy^2)^4 \div \left(\frac{3x^2}{yz}\right)^3 = x^4y^8 \div \frac{27x^6}{y^3z^3}$

$=x^4y^8 \times \frac{y^3z^3}{27x^6}$

$=\frac{y^{11}z^3}{27x^2}$

(10) $4a^3b^4 \div 3a^3b^4 \times (-6b^2)$

$=4a^3b^4 \times \frac{1}{3a^3b^4} \times (-6b^2)$

$=-8b^2$

(11) $\left(-\frac{3}{2}x^2y\right)^2 \times \left(-\frac{1}{3}xy\right)^2$

$=\frac{9}{4}x^4y^2 \times \frac{1}{9}x^2y^2$

$=\frac{x^6y^4}{4}$

(12) $(-a^2b)^4 \times \left(-\frac{b}{5a^2}\right) \div \left(\frac{b^2}{2a^3}\right)^2$

$=a^8b^4 \times \left(-\frac{b}{5a^2}\right) \div \frac{b^4}{4a^6}$

$=a^8b^4 \times \left(-\frac{b}{5a^2}\right) \times \frac{4a^6}{b^4}$

$=-\frac{4a^{12}b}{5}$

L - 23

(1) $14b^2+4b-18$
(2) $-8x^2+2x-4$
(3) $2y^2-5y+6$
(4) $14a^2-a$
(5) $2b^2-4b+2$
(6) $6x^2+2x+10$
(7) $-8y^2-5y-34$
(8) $3b^2-7b-7$
(9) x^2+8x+1
(10) $-2y^2-11y-2$
(11) $4a^2+9a$
(12) $-6b^2+5b+10$
(13) $9x^2-17x-13$
(14) $-y^2-3y+2$

〈풀이〉

※ 이차식의 덧셈, 뺄셈도 일차식의 덧셈, 뺄셈과 같은 방법으로 이차항은 이차항끼리, 일차항은 일차항끼리, 상수항은 상수항끼리 간단히 한다.

• 괄호를 풀 때
괄호 앞이 +이면 ⇨ 괄호 안의 부호는 그대로
괄호 앞이 −이면 ⇨ 괄호 안의 각 항의 부호를 반대로

(1) $2(4b^2+3b-5)+(6b^2-2b-8)$
$=8b^2+6b-10+6b^2-2b-8$
$=8b^2+6b^2+6b-2b-10-8$
$=14b^2+4b-18$

(2) $(x^2+2x-7)+3(-3x^2+1)$
$=x^2+2x-7-9x^2+3$
$=x^2-9x^2+2x-7+3$
$=-8x^2+2x-4$

(3) $(-6y^2-y+2)+4(2y^2-y+1)$
$=-6y^2-y+2+8y^2-4y+4$
$=-6y^2+8y^2-y-4y+2+4$
$=2y^2-5y+6$

(4) $2(a^2-2a)+3(4a^2+a)$
$=2a^2-4a+12a^2+3a$
$=2a^2+12a^2-4a+3a$
$=14a^2-a$

(5) $2(-4b^2-b)+2(5b^2-b+1)$
$=-8b^2-2b+10b^2-2b+2$
$=-8b^2+10b^2-2b-2b+2$
$=2b^2-4b+2$

(6) $4(x^2-x+3)+2(x^2+3x-1)$
$=4x^2-4x+12+2x^2+6x-2$
$=4x^2+2x^2-4x+6x+12-2$
$=6x^2+2x+10$

(7) $-3(4y^2-3y+8)+2(2y^2-7y-5)$
$=-12y^2+9y-24+4y^2-14y-10$
$=-12y^2+4y^2+9y-14y-24-10$
$=-8y^2-5y-34$

(8) $4(b^2-b-2)-(b^2+3b-1)$
$=4b^2-4b-8-b^2-3b+1$
$=4b^2-b^2-4b-3b-8+1$
$=3b^2-7b-7$

(9) $(4x^2+2x+1)-3(x^2-2x)$
$=4x^2+2x+1-3x^2+6x$
$=4x^2-3x^2+2x+6x+1$
$=x^2+8x+1$

(10) $(2y^2-3y-6)-4(y^2+2y-1)$
$=2y^2-3y-6-4y^2-8y+4$
$=2y^2-4y^2-3y-8y-6+4$
$=-2y^2-11y-2$

(11) $3(2a^2+a)-2(a^2-3a)$
$=6a^2+3a-2a^2+6a$
$=6a^2-2a^2+3a+6a$
$=4a^2+9a$

(12) $2(3b^2+13b+5)-3(4b^2+7b)$
$=6b^2+26b+10-12b^2-21b$
$=6b^2-12b^2+26b-21b+10$
$=-6b^2+5b+10$

(13) $2(2x^2-x-4)-5(-x^2+3x+1)$
$=4x^2-2x-8+5x^2-15x-5$
$=4x^2+5x^2-2x-15x-8-5$
$=9x^2-17x-13$

(14) $2(y^2-3y+4)-3(y^2-y+2)$
$=2y^2-6y+8-3y^2+3y-6$
$=2y^2-3y^2-6y+3y+8-6$
$=-y^2-3y+2$

L - 24

(1) $-2a^2-5a+4$
(2) $-2y^2-5y$
(3) $5x^2-4x+1$
(4) $-a^2-12a$
(5) $-5b^2+2b+1$
(6) $6x^2-7x+4$
(7) $8y^2+5y-8$
(8) $2a^2-6a+7$
(9) $4y-10$
(10) $-x^2-x+8$
(11) a^2-10
(12) $-13b^2+16b-4$
(13) $13x^2+6x-5$
(14) $8y^2+y-7$

〈풀이〉

(1) $3(-2a^2+a)+4(a^2-2a+1)$
$=-6a^2+3a+4a^2-8a+4$
$=-6a^2+4a^2+3a-8a+4$
$=-2a^2-5a+4$

(2) $2(y^2-2y-1)-(4y^2+y-2)$
$=2y^2-4y-2-4y^2-y+2$
$=2y^2-4y^2-4y-y-2+2$
$=-2y^2-5y$

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

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

(5) $2(-3b^2+4)+(b^2+2b-7)$
$=-6b^2+8+b^2+2b-7$
$=-6b^2+b^2+2b+8-7$
$=-5b^2+2b+1$

(6) $(3x^2-x+4)-3(-x^2+2x)$
$=3x^2-x+4+3x^2-6x$
$=3x^2+3x^2-x-6x+4$
$=6x^2-7x+4$

(7) $(5y^2-y+1)+3(y^2+2y-3)$
$=5y^2-y+1+3y^2+6y-9$
$=5y^2+3y^2-y+6y+1-9$
$=8y^2+5y-8$

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

(9) $2(-y^2-5)+2(y^2+2y)$
$=-2y^2-10+2y^2+4y$
$=-2y^2+2y^2+4y-10$
$=4y-10$

(10) $(2x^2+5x+2)-3(x^2+2x-2)$
$=2x^2+5x+2-3x^2-6x+6$
$=2x^2-3x^2+5x-6x+2+6$
$=-x^2-x+8$

(11) $2(-a^2-a-3)+(3a^2+2a-4)$
$=-2a^2-2a-6+3a^2+2a-4$
$=-2a^2+3a^2-2a+2a-6-4$
$=a^2-10$

(12) $5(-b^2+2b)-2(4b^2-3b+2)$
$=-5b^2+10b-8b^2+6b-4$
$=-5b^2-8b^2+10b+6b-4$
$=-13b^2+16b-4$

(13) $4(x^2+3x-2)+3(3x^2-2x+1)$
$=4x^2+12x-8+9x^2-6x+3$
$=4x^2+9x^2+12x-6x-8+3$
$=13x^2+6x-5$

(14) $3(y^2+2y+1)-5(-y^2+y+2)$
$=3y^2+6y+3+5y^2-5y-10$
$=3y^2+5y^2+6y-5y+3-10$
$=8y^2+y-7$

L - 25

(1) $3a^2-9a-6$
(2) x^2+7x-4
(3) $-2b^2+3b+2$
(4) $2x^2+6x$
(5) $-y^2-3y+14$
(6) $-a^2-17a+5$
(7) $-12y^2+5y-4$
(8) $3a^2-\frac{7}{6}a-\frac{1}{6}$
(9) $\frac{7}{12}x^2+\frac{1}{6}x+\frac{11}{12}$
(10) $-\frac{1}{6}b^2-3b+\frac{4}{3}$
(11) $\frac{1}{4}y^2+4y-3$

〈풀이〉

(1) $-(a^2+3a+4)+2(2a^2-3a-1)$
$=-a^2-3a-4+4a^2-6a-2$
$=-a^2+4a^2-3a-6a-4-2$
$=3a^2-9a-6$

(2) $2(3x^2+x-7)-5(x^2-x-2)$
$=6x^2+2x-14-5x^2+5x+10$
$=6x^2-5x^2+2x+5x-14+10$
$=x^2+7x-4$

(3) $3(2b^2-b)-2(4b^2-3b-1)$
$=6b^2-3b-8b^2+6b+2$
$=6b^2-8b^2-3b+6b+2$
$=-2b^2+3b+2$

(4) $2(3x^2-x+2)+4(-x^2+2x-1)$
$=6x^2-2x+4-4x^2+8x-4$
$=6x^2-4x^2-2x+8x+4-4$
$=2x^2+6x$

(5) $2(y^2-3y+4)+3(-y^2+y+2)$
$=2y^2-6y+8-3y^2+3y+6$
$=2y^2-3y^2-6y+3y+8+6$
$=-y^2-3y+14$

(6) $5(a^2-a-2)-3(2a^2+4a-5)$
$=5a^2-5a-10-6a^2-12a+15$
$=5a^2-6a^2-5a-12a-10+15$
$=-a^2-17a+5$

(7) $3(-2y^2-y+2)-2(3y^2-4y+5)$
$=-6y^2-3y+6-6y^2+8y-10$
$=-6y^2-6y^2-3y+8y+6-10$
$=-12y^2+5y-4$

(8) $\frac{1}{2}(4a^2-3a+1)+\frac{1}{3}(3a^2+a-2)$
$=2a^2-\frac{3}{2}a+\frac{1}{2}+a^2+\frac{1}{3}a-\frac{2}{3}$
$=2a^2+a^2-\frac{3}{2}a+\frac{1}{3}a+\frac{1}{2}-\frac{2}{3}$
$=3a^2-\frac{7}{6}a-\frac{1}{6}$

(9) $\frac{1}{4}(x^2+2x+1)+\frac{1}{3}(x^2-x+2)$
$=\frac{1}{4}x^2+\frac{1}{2}x+\frac{1}{4}+\frac{1}{3}x^2-\frac{1}{3}x+\frac{2}{3}$
$=\frac{1}{4}x^2+\frac{1}{3}x^2+\frac{1}{2}x-\frac{1}{3}x+\frac{1}{4}+\frac{2}{3}$
$=\frac{7}{12}x^2+\frac{1}{6}x+\frac{11}{12}$

(10) $\frac{1}{3}(b^2-6b+4)-\frac{1}{2}(b^2+2b)$
$=\frac{1}{3}b^2-2b+\frac{4}{3}-\frac{1}{2}b^2-b$
$=\frac{1}{3}b^2-\frac{1}{2}b^2-2b-b+\frac{4}{3}$
$=-\frac{1}{6}b^2-3b+\frac{4}{3}$

(11) $\frac{1}{4}(3y^2+4y-6)-\frac{1}{2}(y^2-6y+3)$
$=\frac{3}{4}y^2+y-\frac{3}{2}-\frac{1}{2}y^2+3y-\frac{3}{2}$
$=\frac{3}{4}y^2-\frac{1}{2}y^2+y+3y-\frac{3}{2}-\frac{3}{2}$
$=\frac{1}{4}y^2+4y-3$

L - 26

(1) $6x-11y$
(2) $6b$
(3) $-x+9y$
(4) $9a-7b$
(5) $8x-2y-2$
(6) a
(7) $7x-8y-1$

〈풀이〉

※ 하나의 괄호를 풀 때마다 괄호 안을 될 수 있는 대로 간단히 한 후 또 다른 괄호를 푼다.

(1) $2x-\{3y-4(x-2y)\}$
$=2x-(3y-4x+8y)$
$=2x-(-4x+11y)$
$=2x+4x-11y$
$=6x-11y$

(2) $6a+3b-\{2a+(4a-3b)\}$
$=6a+3b-(2a+4a-3b)$
$=6a+3b-(6a-3b)$
$=6a+3b-6a+3b$
$=6b$

(3) $3x-\{6x-4y-(2x+3y)\}+2y$
$=3x-(6x-4y-2x-3y)+2y$
$=3x-(4x-7y)+2y$
$=3x-4x+7y+2y$
$=-x+9y$

(4) $4a-[\{5b-(3a-2b)\}-2a]$
$=4a-\{(5b-3a+2b)-2a\}$
$=4a-\{(-3a+7b)-2a\}$
$=4a-(-3a+7b-2a)$
$=4a-(-5a+7b)$
$=4a+5a-7b$
$=9a-7b$

(5) $6x-[6y-\{5x-(3x-4y+2)\}]$
$=6x-\{6y-(5x-3x+4y-2)\}$
$=6x-\{6y-(2x+4y-2)\}$
$=6x-(6y-2x-4y+2)$
$=6x-(-2x+2y+2)$
$=6x+2x-2y-2$
$=8x-2y-2$

(6) $3a-[3a-2b+\{2a-(3a-2b)\}]$
$=3a-\{3a-2b+(2a-3a+2b)\}$
$=3a-\{3a-2b+(-a+2b)\}$
$=3a-(3a-2b-a+2b)$
$=3a-(2a)$
$=3a-2a$
$=a$

(7) $5x-[3y-\{5x+6-(5y+3x)\}+7]$
$=5x-\{3y-(5x+6-5y-3x)+7\}$
$=5x-\{3y-(2x-5y+6)+7\}$
$=5x-(3y-2x+5y-6+7)$
$=5x-(-2x+8y+1)$
$=5x+2x-8y-1$
$=7x-8y-1$

L - 27

(1) $-x^2-13x-5$
(2) $5b^2-7b+4$
(3) $-y^2+7y-5$
(4) $4a^2-a+5$
(5) $3x^2-2x$
(6) $-5b^2+3$
(7) $3y^2+1$

〈풀이〉

※ 괄호를 풀고 이차항은 이차항끼리, 일차항은 일차항끼리, 상수항은 상수항끼리 모아서 간단히 한다.

(1) $4x^2-\{5x^2+7x-(-6x-5)\}$
$=4x^2-(5x^2+7x+6x+5)$
$=4x^2-(5x^2+13x+5)$
$=4x^2-5x^2-13x-5$
$=-x^2-13x-5$
〈다른 풀이〉 $4x^2-\{5x^2+7x-(-6x-5)\}$
$=4x^2-5x^2-7x+(-6x-5)$
$=-x^2-7x-6x-5$
$=-x^2-13x-5$
위와 같이 { } → ( )의 순서로 괄호를 풀어도 되지만, 계산 과정에서 부호의 바뀜을 실수할 수 있으므로 ( ) → { }의 순서로 괄호를 풀도록 한다.

(2) $2b^2-\{4b-3(b^2-b+3)+5\}$
$=2b^2-(4b-3b^2+3b-9+5)$
$=2b^2-(-3b^2+7b-4)$
$=2b^2+3b^2-7b+4$
$=5b^2-7b+4$

(3) $3y^2+y-\{4y^2-2y-(4y-5)\}$
$=3y^2+y-(4y^2-2y-4y+5)$
$=3y^2+y-(4y^2-6y+5)$
$=3y^2+y-4y^2+6y-5$
$=-y^2+7y-5$

(4) $5a^2-[3a^2+\{a-(2a^2+5)\}]$
$=5a^2-\{3a^2+(a-2a^2-5)\}$
$=5a^2-(3a^2+a-2a^2-5)$
$=5a^2-(a^2+a-5)$
$=5a^2-a^2-a+5$
$=4a^2-a+5$

(5) $4x^2+2x-[3x^2+\{3x-(2x^2-x)\}]$
$=4x^2+2x-\{3x^2+(3x-2x^2+x)\}$
$=4x^2+2x-\{3x^2+(-2x^2+4x)\}$
$=4x^2+2x-(3x^2-2x^2+4x)$
$=4x^2+2x-(x^2+4x)$
$=4x^2+2x-x^2-4x$
$=3x^2-2x$

(6) $b^2-2-[3b^2-5-\{b-2b^2-(b^2+b)\}]$
$=b^2-2-\{3b^2-5-(b-2b^2-b^2-b)\}$
$=b^2-2-\{3b^2-5-(-3b^2)\}$
$=b^2-2-(3b^2-5+3b^2)$
$=b^2-2-(6b^2-5)$
$=b^2-2-6b^2+5$
$=-5b^2+3$

(7) $2y^2-[y^2+4y-\{4y^2+3y+1-(2y^2-y)\}]$
$=2y^2-\{y^2+4y-(4y^2+3y+1-2y^2+y)\}$
$=2y^2-\{y^2+4y-(2y^2+4y+1)\}$
$=2y^2-(y^2+4y-2y^2-4y-1)$
$=2y^2-(-y^2-1)$
$=2y^2+y^2+1$
$=3y^2+1$

L - 28

(1) $-4a+8b$
(2) $9x-3y$
(3) b^2-7b+8
(4) $-y^2-5$
(5) $3y$
(6) $5a^2+a-2$
(7) $-4a+b+5$
(8) $7x$

〈풀이〉

(1) $3a-\{4a-5b+3(a-b)\}$
$=3a-(4a-5b+3a-3b)$
$=3a-(7a-8b)$
$=3a-7a+8b$
$=-4a+8b$

(2) $8x-[2x-\{(x-4y)+2x\}-y]$
$=8x-\{2x-(x-4y+2x)-y\}$
$=8x-\{2x-(3x-4y)-y\}$
$=8x-(2x-3x+4y-y)$
$=8x-(-x+3y)$
$=8x+x-3y$
$=9x-3y$

(3) $4b^2-\{3b^2+5b-2(-b+4)\}$
$=4b^2-(3b^2+5b+2b-8)$
$=4b^2-(3b^2+7b-8)$
$=4b^2-3b^2-7b+8$
$=b^2-7b+8$

(4) $y^2+[-3y-\{2y^2+y-(4y-5)\}]$
$=y^2+\{-3y-(2y^2+y-4y+5)\}$
$=y^2+\{-3y-(2y^2-3y+5)\}$
$=y^2+(-3y-2y^2+3y-5)$
$=y^2+(-2y^2-5)$
$=y^2-2y^2-5$
$=-y^2-5$

(5) $3x+2y-\{x+(2x-y)\}$
$=3x+2y-(x+2x-y)$
$=3x+2y-(3x-y)$
$=3x+2y-3x+y$
$=3y$

(6) $3a^2-\{2a+(-2a^2-3a)+2\}$
$=3a^2-(2a-2a^2-3a+2)$
$=3a^2-(-2a^2-a+2)$
$=3a^2+2a^2+a-2$
$=5a^2+a-2$

(7) $5-[2a-\{(a-b)-(3a-2b)\}]$
$=5-\{2a-(a-b-3a+2b)\}$
$=5-\{2a-(-2a+b)\}$
$=5-(2a+2a-b)$
$=5-(4a-b)$
$=5-4a+b$
$=-4a+b+5$

(8) $7x-[x-2x^2-\{2x-3x^2+(-x+x^2)\}]$
$=7x-\{x-2x^2-(2x-3x^2-x+x^2)\}$
$=7x-\{x-2x^2-(-2x^2+x)\}$
$=7x-(x-2x^2+2x^2-x)$
$=7x$

L - 29

(1) $-a^2-1$
(2) $7y^2-5y-4$
(3) $-9x^2+12x-6$
(4) $9a^2+4a+11$
(5) $2b^2+9b-7$
(6) $-2x^2+9x-19$
(7) $-10y^2-2y+2$
(8) $a-4b$
(9) $2x^2-9x+2$
(10) $-4a-7b$
(11) $5y^2+y-1$

〈풀이〉

(1) $3(a^2+2a+3)-2(2a^2+3a+5)$
$=3a^2+6a+9-4a^2-6a-10$
$=-a^2-1$

(2) $2(2y^2-4y+1)+3(y^2+y-2)$
$=4y^2-8y+2+3y^2+3y-6$
$=7y^2-5y-4$

(3) $5(-x^2+2x)-2(2x^2-x+3)$
$=-5x^2+10x-4x^2+2x-6$
$=-9x^2+12x-6$

(4) $2(2a^2-3a-2)+5(a^2+2a+3)$
$=4a^2-6a-4+5a^2+10a+15$
$=9a^2+4a+11$

(5) $3(2b^2+b-1)-2(2b^2-3b+2)$
$=6b^2+3b-3-4b^2+6b-4$
$=2b^2+9b-7$

(6) $3(2x^2+x-5)+2(-4x^2+3x-2)$
$=6x^2+3x-15-8x^2+6x-4$
$=-2x^2+9x-19$

(7) $2(-3y^2+y+5)-4(y^2+y+2)$
$=-6y^2+2y+10-4y^2-4y-8$
$=-10y^2-2y+2$

(8) $2a-\{2a+b-(a-b)\}-2b$
$=2a-(2a+b-a+b)-2b$
$=2a-(a+2b)-2b$
$=2a-a-2b-2b$
$=a-4b$

(9) $2x^2-4x-\{2x^2+6x-3-(2x^2+x-1)\}$
$=2x^2-4x-(2x^2+6x-3-2x^2-x+1)$
$=2x^2-4x-(5x-2)$
$=2x^2-4x-5x+2$
$=2x^2-9x+2$

(10) $3a-2b-[2a+3b-\{4b-2a-(3a+6b)\}]$
$=3a-2b-\{2a+3b-(4b-2a-3a-6b)\}$
$=3a-2b-\{2a+3b-(-5a-2b)\}$
$=3a-2b-(2a+3b+5a+2b)$
$=3a-2b-(7a+5b)$
$=3a-2b-7a-5b$
$=-4a-7b$

(11) $4y^2-[y^2-4y-\{2y^2-y-(2y+1)\}]$
$=4y^2-\{y^2-4y-(2y^2-y-2y-1)\}$
$=4y^2-\{y^2-4y-(2y^2-3y-1)\}$
$=4y^2-(y^2-4y-2y^2+3y+1)$
$=4y^2-(-y^2-y+1)$
$=4y^2+y^2+y-1$
$=5y^2+y-1$

L - 30

(1) $\frac{11}{6}b^2-\frac{9}{4}b-1$ (2) $\frac{1}{6}a^2-5a+2$
(3) $\frac{8}{3}y^2+2y-\frac{5}{6}$ (4) $4x^2-\frac{7}{2}x-2$
(5) $-4x-4y$ (6) $4a^2-8a+7$
(7) $-a-4b$ (8) $-x^2+2x+8y$

〈풀이〉

(1) $\frac{1}{4}(2b^2-3b+8)+\frac{1}{6}(8b^2-9b-18)$
$=\frac{1}{2}b^2-\frac{3}{4}b+2+\frac{4}{3}b^2-\frac{3}{2}b-3$
$=\frac{11}{6}b^2-\frac{9}{4}b-1$

(2) $\frac{2}{3}(a^2-9a+6)-2\left(\frac{1}{4}a^2-\frac{1}{2}a+1\right)$
$=\frac{2}{3}a^2-6a+4-\frac{1}{2}a^2+a-2$
$=\frac{1}{6}a^2-5a+2$

(3) $2\left(\frac{2}{3}y^2-\frac{1}{5}y+\frac{1}{4}\right)+4\left(\frac{1}{3}y^2+\frac{3}{5}y-\frac{1}{3}\right)$
$=\frac{4}{3}y^2-\frac{2}{5}y+\frac{1}{2}+\frac{4}{3}y^2+\frac{12}{5}y-\frac{4}{3}$
$=\frac{8}{3}y^2+2y-\frac{5}{6}$

(4) $3(2x^2-x-1)-3\left(\frac{2}{3}x^2+\frac{1}{6}x-\frac{1}{3}\right)$
$=6x^2-3x-3-2x^2-\frac{1}{2}x+1$
$=4x^2-\frac{7}{2}x-2$

(5) $-3x-2y-\{(3x-2y)-(2x-4y)\}$
$=-3x-2y-(3x-2y-2x+4y)$
$=-3x-2y-(x+2y)$
$=-3x-2y-x-2y$
$=-4x-4y$

(6) $a^2-\{5a-3(a^2-a+4)+5\}$
$=a^2-(5a-3a^2+3a-12+5)$
$=a^2-(-3a^2+8a-7)$
$=a^2+3a^2-8a+7$
$=4a^2-8a+7$

(7) $-5a-[2a-\{a-3b-(-5a+2b)\}-b]$
$=-5a-\{2a-(a-3b+5a-2b)-b\}$
$=-5a-\{2a-(6a-5b)-b\}$
$=-5a-(2a-6a+5b-b)$
$=-5a-(-4a+4b)$
$=-5a+4a-4b$
$=-a-4b$

(8) $4x^2-[x-4y+\{5x^2-3y-(3x+y)\}]$
$=4x^2-\{x-4y+(5x^2-3y-3x-y)\}$
$=4x^2-\{x-4y+(5x^2-3x-4y)\}$
$=4x^2-(x-4y+5x^2-3x-4y)$
$=4x^2-(5x^2-2x-8y)$
$=4x^2-5x^2+2x+8y$
$=-x^2+2x+8y$

L - 31

(1) $2a$, $3b$, $6a^2+9ab$ (2) $-6a^2+9ab$
(3) $-6a^2-9ab$ (4) $4x^2+6xy+8x$
(5) $4x^2-6xy+8x$ (6) $-4x^2-6xy+8x$
(7) $2x$, $3y$, $-6x^2-9xy$ (8) $-6x^2+9xy$
(9) $6x^2-9xy$ (10) $6x^2+9xy$
(11) $-4a^2-6ab+8a$ (12) $-4a^2+6ab+8a$
(13) $4a^2-6ab-8a$ (14) $4a^2+6ab+8a$

〈풀이〉

※ 식을 전개할 때에는 분배법칙을 이용하고, 문자끼리의 곱셈을 할 때에는 지수법칙을 이용한다.

(2) $3a(-2a+3b)$
$=3a\times(-2a)+3a\times3b$
$=-6a^2+9ab$

(3) $3a(-2a-3b)$
$=3a\times(-2a)+3a\times(-3b)$
$=-6a^2-9ab$

(4) $2x(2x+3y+4)$
$=2x\times2x+2x\times3y+2x\times4$
$=4x^2+6xy+8x$

(5) $2x(2x-3y+4)$
$=2x\times2x+2x\times(-3y)+2x\times4$
$=4x^2-6xy+8x$

(6) $2x(-2x-3y+4)$
$=2x\times(-2x)+2x\times(-3y)+2x\times4$
$=-4x^2-6xy+8x$

(8) $-3x(2x-3y)$
$=-3x\times2x-3x\times(-3y)$
$=-6x^2+9xy$

(9) $-3x(-2x+3y)$
$=-3x\times(-2x)-3x\times3y$
$=6x^2-9xy$

(10) $-3x(-2x-3y)$
$=-3x\times(-2x)-3x\times(-3y)$
$=6x^2+9xy$

(11) $-2a(2a+3b-4)$
$=-2a\times2a-2a\times3b-2a\times(-4)$
$=-4a^2-6ab+8a$

(12) $-2a(2a-3b-4)$
$=-2a\times2a-2a\times(-3b)-2a\times(-4)$
$=-4a^2+6ab+8a$

(13) $-2a(-2a+3b+4)$
$=-2a\times(-2a)-2a\times3b-2a\times4$
$=4a^2-6ab-8a$

(14) $-2a(-2a-3b-4)$
$=-2a\times(-2a)-2a\times(-3b)-2a\times(-4)$
$=4a^2+6ab+8a$

L - 32

(1) $-5a^2+3a$ (2) $10xy+14x$
(3) $5a^2-10ab+15a$ (4) $-6ax+12ay$
(5) $9a^2+3ab$ (6) $-12a^3b-16a^2b+20ab^2$
(7) $21ax-12ay$ (8) $-\frac{1}{2}x^2-3x$
(9) $ab-7a$ (10) $-2xy-\frac{4}{5}y^2$
(11) $-4x^2-2xy-12x$ (12) $-x^2+2xy-\frac{2}{3}x$
(13) $16a^3-8a^2-12a$ (14) $\frac{3}{4}x^3y+\frac{3}{2}x^2y-3xy^2$

〈풀이〉

(1) $a(-5a+3)=a\times(-5a)+a\times3$
$=-5a^2+3a$

(2) $2x(5y+7)=2x\times5y+2x\times7$
$=10xy+14x$

(3) $5a(a-2b+3)=5a\times a+5a\times(-2b)+5a\times3$
$=5a^2-10ab+15a$

(4) $-6a(x-2y)=-6a\times x-6a\times(-2y)$
$=-6ax+12ay$

(5) $-3a(-3a-b)$
$=-3a\times(-3a)-3a\times(-b)$
$=9a^2+3ab$

(6) $-4ab(3a^2+4a-5b)$
$=-4ab\times3a^2-4ab\times4a-4ab\times(-5b)$
$=-12a^3b-16a^2b+20ab^2$

(7) $3a(7x-4y)$
$=3a\times7x+3a\times(-4y)$
$=21ax-12ay$

(8) $-\frac{1}{2}x(x+6)$
$=-\frac{1}{2}x\times x-\frac{1}{2}x\times6$
$=-\frac{1}{2}x^2-3x$

(9) $(-b+7)\times(-a)$
$=-b\times(-a)+7\times(-a)$
$=ab-7a$

(10) $(-5x-2y)\times\frac{2}{5}y$
$=-5x\times\frac{2}{5}y-2y\times\frac{2}{5}y$
$=-2xy-\frac{4}{5}y^2$

(11) $-2x(2x+y+6)$
$=-2x\times2x-2x\times y-2x\times6$
$=-4x^2-2xy-12x$

(12) $\frac{1}{3}x(-3x+6y-2)$
$=\frac{1}{3}x\times(-3x)+\frac{1}{3}x\times6y+\frac{1}{3}x\times(-2)$
$=-x^2+2xy-\frac{2}{3}x$

(13) $(4a^2-2a-3)\times 4a$
$=4a^2\times 4a-2a\times 4a-3\times 4a$
$=16a^3-8a^2-12a$

(14) $(-x^2-2x+4y)\times\left(-\frac{3}{4}xy\right)$
$=-x^2\times\left(-\frac{3}{4}xy\right)-2x\times\left(-\frac{3}{4}xy\right)+4y\times\left(-\frac{3}{4}xy\right)$
$=\frac{3}{4}x^3y+\frac{3}{2}x^2y-3xy^2$

L- 33

(1) $-5x^2+9x$
(2) $-5a^2-ab$
(3) $-13x^2+6xy$
(4) $-a^2+7a+2$
(5) $2x^2-7xy+4x$
(6) $7x^2+17x-1$
(7) $4a^2-8ab+2a$
(8) $21x^2+10x-12$
(9) $-a^2+13a+5$
(10) $2x^2-3x$
(11) $a^2+2ab-2a$
(12) $-6x^2+20xy+4y^2$

〈풀이〉
※ 분배법칙을 이용하여 전개한 후 동류항끼리 모아서 간단히 한다.

(1) $x(3x+5)-4x(2x-1)$
$=3x^2+5x-8x^2+4x$
$=-5x^2+9x$

(2) $-2a(a-b)+3a(-a-b)$
$=-2a^2+2ab-3a^2-3ab$
$=-5a^2-ab$

(3) $-5x(x-2y)-4x(2x+y)$
$=-5x^2+10xy-8x^2-4xy$
$=-13x^2+6xy$

(4) $3a(-a+3)+2(a^2-a+1)$
$=-3a^2+9a+2a^2-2a+2$
$=-a^2+7a+2$

(5) $4x(x-y+1)-x(2x+3y)$
$=4x^2-4xy+4x-2x^2-3xy$
$=2x^2-7xy+4x$

(6) $3x-1+7x(x+2)$
$=3x-1+7x^2+14x$
$=7x^2+17x-1$

(7) $-2a(a+2b)+2a(3a-2b+1)$
$=-2a^2-4ab+6a^2-4ab+2a$
$=4a^2-8ab+2a$

(8) $(3x+1)\times 7x-3(4-x)$
$=21x^2+7x-12+3x$
$=21x^2+10x-12$

(9) $5(a^2-a+1)-(a-3)\times 6a$
$=5a^2-5a+5-6a^2+18a$
$=-a^2+13a+5$

(10) $-3x(-x+2)-\frac{1}{2}x(2x-6)$
$=3x^2-6x-x^2+3x$
$=2x^2-3x$

(11) $\frac{2}{3}a(3a+6b-9)+\frac{1}{4}a(-4a-8b+16)$
$=2a^2+4ab-6a-a^2-2ab+4a$
$=a^2+2ab-2a$

(12) $-\frac{3}{2}x(4x-8y)+(2x+y)\times 4y$
$=-6x^2+12xy+8xy+4y^2$
$=-6x^2+20xy+4y^2$

L- 34

(1) $3a, 3a, 3a, 2a+3$
(2) $2a-3$
(3) $-2a-3$
(4) $2x-y+3$
(5) $-2x+y-3$
(6) $-2x-y+3$
(7) $-3x, -3x, -3x, -2x-3$
(8) $-2x+3$
(9) $2x-3$
(10) $2x+3$
(11) $-2a-b+3$
(12) $-2a+b+3$
(13) $2a-b-3$
(14) $2a+b+3$

〈풀이〉
※ 나누는 식의 계수가 정수인 경우에는 분수의 꼴로 고쳐서 푸는 것이 편리하다.

(1) 〈다른 풀이〉
$(6a^2+9a)\div 3a=(6a^2+9a)\times\frac{1}{3a}$
$=6a^2\times\frac{1}{3a}+9a\times\frac{1}{3a}$
$=2a+3$

(2) $(6a^2-9a)\div 3a=\frac{6a^2-9a}{3a}$
$=\frac{6a^2}{3a}-\frac{9a}{3a}$
$=2a-3$

(3) $(-6a^2-9a)\div 3a=\frac{-6a^2-9a}{3a}$
$=\frac{-6a^2}{3a}-\frac{9a}{3a}$
$=-2a-3$

(4) $(4x^2-2xy+6x)\div 2x$

$=\dfrac{4x^2-2xy+6x}{2x}$

$=\dfrac{4x^2}{2x}-\dfrac{2xy}{2x}+\dfrac{6x}{2x}$

$=2x-y+3$

(5) $(-4x^2+2xy-6x)\div 2x$

$=\dfrac{-4x^2+2xy-6x}{2x}$

$=\dfrac{-4x^2}{2x}+\dfrac{2xy}{2x}-\dfrac{6x}{2x}$

$=-2x+y-3$

(6) $(-4x^2-2xy+6x)\div 2x$

$=\dfrac{-4x^2-2xy+6x}{2x}$

$=\dfrac{-4x^2}{2x}-\dfrac{2xy}{2x}+\dfrac{6x}{2x}$

$=-2x-y+3$

(7) 〈다른 풀이〉

$(6x^2+9x)\div(-3x)$

$=(6x^2+9x)\times\left(-\dfrac{1}{3x}\right)$

$=6x^2\times\left(-\dfrac{1}{3x}\right)+9x\times\left(-\dfrac{1}{3x}\right)$

$=-2x-3$

(8) $(6x^2-9x)\div(-3x)=\dfrac{6x^2-9x}{-3x}$

$=\dfrac{6x^2}{-3x}-\dfrac{9x}{-3x}$

$=-2x+3$

(9) $(-6x^2+9x)\div(-3x)=\dfrac{-6x^2+9x}{-3x}$

$=\dfrac{-6x^2}{-3x}+\dfrac{9x}{-3x}$

$=2x-3$

(10) $(-6x^2-9x)\div(-3x)=\dfrac{-6x^2-9x}{-3x}$

$=\dfrac{-6x^2}{-3x}-\dfrac{9x}{-3x}$

$=2x+3$

(11) $(4a^2+2ab-6a)\div(-2a)$

$=\dfrac{4a^2+2ab-6a}{-2a}$

$=\dfrac{4a^2}{-2a}+\dfrac{2ab}{-2a}-\dfrac{6a}{-2a}$

$=-2a-b+3$

(12) $(4a^2-2ab-6a)\div(-2a)$

$=\dfrac{4a^2-2ab-6a}{-2a}$

$=\dfrac{4a^2}{-2a}-\dfrac{2ab}{-2a}-\dfrac{6a}{-2a}$

$=-2a+b+3$

(13) $(-4a^2+2ab+6a)\div(-2a)$

$=\dfrac{-4a^2+2ab+6a}{-2a}$

$=\dfrac{-4a^2}{-2a}+\dfrac{2ab}{-2a}+\dfrac{6a}{-2a}$

$=2a-b-3$

(14) $(-4a^2-2ab-6a)\div(-2a)$

$=\dfrac{-4a^2-2ab-6a}{-2a}$

$=\dfrac{-4a^2}{-2a}-\dfrac{2ab}{-2a}-\dfrac{6a}{-2a}$

$=2a+b+3$

L- 35

(1) $\dfrac{2}{x}, \dfrac{2}{x}, \dfrac{2}{x}, 4x+6$ (2) $-4x+6$

(3) $-4x-6$ (4) $9a+3b+6$

(5) $9a-3b+6$ (6) $-9a-3b+6$

(7) $-\dfrac{2}{a}, -\dfrac{2}{a}, -\dfrac{2}{a}, -4a-6$

(8) $-4a+6$ (9) $4a-6$

(10) $4a+6$ (11) $-9x-3y+6$

(12) $-9x+3y+6$ (13) $9x-3y-6$

(14) $9x+3y+6$

〈풀이〉

※ 나누는 식의 계수가 분수인 경우에는 곱셈으로 고쳐서 푸는 것이 편리하다.

(2) $(-2x^2+3x)\div\dfrac{1}{2}x=(-2x^2+3x)\times\dfrac{2}{x}$

$=-2x^2\times\dfrac{2}{x}+3x\times\dfrac{2}{x}$

$=-4x+6$

(3) $(-2x^2-3x)\div\dfrac{1}{2}x=(-2x^2-3x)\times\dfrac{2}{x}$

$=-2x^2\times\dfrac{2}{x}-3x\times\dfrac{2}{x}$

$=-4x-6$

(4) $(3a^2+ab+2a)\div\frac{1}{3}a$

$=(3a^2+ab+2a)\times\frac{3}{a}$

$=3a^2\times\frac{3}{a}+ab\times\frac{3}{a}+2a\times\frac{3}{a}$

$=9a+3b+6$

(5) $(3a^2-ab+2a)\div\frac{1}{3}a$

$=(3a^2-ab+2a)\times\frac{3}{a}$

$=3a^2\times\frac{3}{a}-ab\times\frac{3}{a}+2a\times\frac{3}{a}$

$=9a-3b+6$

(6) $(-3a^2-ab+2a)\div\frac{1}{3}a$

$=(-3a^2-ab+2a)\times\frac{3}{a}$

$=-3a^2\times\frac{3}{a}-ab\times\frac{3}{a}+2a\times\frac{3}{a}$

$=-9a-3b+6$

(8) $(2a^2-3a)\div\left(-\frac{1}{2}a\right)$

$=(2a^2-3a)\times\left(-\frac{2}{a}\right)$

$=2a^2\times\left(-\frac{2}{a}\right)-3a\times\left(-\frac{2}{a}\right)$

$=-4a+6$

(9) $(-2a^2+3a)\div\left(-\frac{1}{2}a\right)$

$=(-2a^2+3a)\times\left(-\frac{2}{a}\right)$

$=-2a^2\times\left(-\frac{2}{a}\right)+3a\times\left(-\frac{2}{a}\right)$

$=4a-6$

(10) $(-2a^2-3a)\div\left(-\frac{1}{2}a\right)$

$=(-2a^2-3a)\times\left(-\frac{2}{a}\right)$

$=-2a^2\times\left(-\frac{2}{a}\right)-3a\times\left(-\frac{2}{a}\right)$

$=4a+6$

(11) $(3x^2+xy-2x)\div\left(-\frac{1}{3}x\right)$

$=(3x^2+xy-2x)\times\left(-\frac{3}{x}\right)$

$=3x^2\times\left(-\frac{3}{x}\right)+xy\times\left(-\frac{3}{x}\right)-2x\times\left(-\frac{3}{x}\right)$

$=-9x-3y+6$

(12) $(3x^2-xy-2x)\div\left(-\frac{1}{3}x\right)$

$=(3x^2-xy-2x)\times\left(-\frac{3}{x}\right)$

$=3x^2\times\left(-\frac{3}{x}\right)-xy\times\left(-\frac{3}{x}\right)-2x\times\left(-\frac{3}{x}\right)$

$=-9x+3y+6$

(13) $(-3x^2+xy+2x)\div\left(-\frac{1}{3}x\right)$

$=(-3x^2+xy+2x)\times\left(-\frac{3}{x}\right)$

$=-3x^2\times\left(-\frac{3}{x}\right)+xy\times\left(-\frac{3}{x}\right)+2x\times\left(-\frac{3}{x}\right)$

$=9x-3y-6$

(14) $(-3x^2-xy-2x)\div\left(-\frac{1}{3}x\right)$

$=(-3x^2-xy-2x)\times\left(-\frac{3}{x}\right)$

$=-3x^2\times\left(-\frac{3}{x}\right)-xy\times\left(-\frac{3}{x}\right)-2x\times\left(-\frac{3}{x}\right)$

$=9x+3y+6$

L- 36

(1) $-4b+5$
(2) $-4a+b$
(3) $3x-2y+1$
(4) $15xy+10$
(5) $2x+10z$
(6) $-8a-12b+16$
(7) $-x-2$
(8) $3a-12b$
(9) $-\frac{1}{3}y-\frac{1}{2}$
(10) $\frac{2}{3}ab-2b$
(11) $-\frac{1}{2}a-b-2$
(12) $3x^2-9x-6$
(13) $-6ab-2a+3b$
(14) $12y^2+2xy-1$

〈풀이〉

(1) $(-8ab+10a)\div 2a=\frac{-8ab+10a}{2a}$

$=\frac{-8ab}{2a}+\frac{10a}{2a}$

$=-4b+5$

(2) $(12a^2-3ab)\div(-3a)=\frac{12a^2-3ab}{-3a}$

$=\frac{12a^2}{-3a}-\frac{3ab}{-3a}$

$=-4a+b$

(3) $(15x^2-10xy+5x)\div 5x$

$=\dfrac{15x^2-10xy+5x}{5x}$

$=\dfrac{15x^2}{5x}-\dfrac{10xy}{5x}+\dfrac{5x}{5x}$

$=3x-2y+1$

(4) $(3x^2y+2x)\div\dfrac{1}{5}x$

$=(3x^2y+2x)\times\dfrac{5}{x}$

$=3x^2y\times\dfrac{5}{x}+2x\times\dfrac{5}{x}$

$=15xy+10$

(5) $(-xy-5yz)\div\left(-\dfrac{1}{2}y\right)$

$=(-xy-5yz)\times\left(-\dfrac{2}{y}\right)$

$=-xy\times\left(-\dfrac{2}{y}\right)-5yz\times\left(-\dfrac{2}{y}\right)$

$=2x+10z$

(6) $(2a^2b+3ab^2-4ab)\div\left(-\dfrac{1}{4}ab\right)$

$=(2a^2b+3ab^2-4ab)\times\left(-\dfrac{4}{ab}\right)$

$=2a^2b\times\left(-\dfrac{4}{ab}\right)+3ab^2\times\left(-\dfrac{4}{ab}\right)$

$-4ab\times\left(-\dfrac{4}{ab}\right)$

$=-8a-12b+16$

(7) $\dfrac{-4x^3-8x^2}{4x^2}=\dfrac{-4x^3}{4x^2}-\dfrac{8x^2}{4x^2}$

$=-x-2$

(8) $(ab-4b^2)\div\dfrac{1}{3}b$

$=(ab-4b^2)\times\dfrac{3}{b}$

$=ab\times\dfrac{3}{b}-4b^2\times\dfrac{3}{b}$

$=3a-12b$

(9) $(2xy+3x)\div(-6x)$

$=\dfrac{2xy+3x}{-6x}$

$=\dfrac{2xy}{-6x}+\dfrac{3x}{-6x}$

$=-\dfrac{1}{3}y-\dfrac{1}{2}$

(10) $(-a^2b+3ab)\div\left(-\dfrac{3}{2}a\right)$

$=(-a^2b+3ab)\times\left(-\dfrac{2}{3a}\right)$

$=-a^2b\times\left(-\dfrac{2}{3a}\right)+3ab\times\left(-\dfrac{2}{3a}\right)$

$=\dfrac{2}{3}ab-2b$

(11) $\dfrac{3a^2+6ab+12a}{-6a}$

$=\dfrac{3a^2}{-6a}+\dfrac{6ab}{-6a}+\dfrac{12a}{-6a}$

$=-\dfrac{1}{2}a-b-2$

(12) $(2x^3-6x^2-4x)\div\dfrac{2}{3}x$

$=(2x^3-6x^2-4x)\times\dfrac{3}{2x}$

$=2x^3\times\dfrac{3}{2x}-6x^2\times\dfrac{3}{2x}-4x\times\dfrac{3}{2x}$

$=3x^2-9x-6$

(13) $(-12a^2b^2-4a^2b+6ab^2)\div 2ab$

$=\dfrac{-12a^2b^2-4a^2b+6ab^2}{2ab}$

$=\dfrac{-12a^2b^2}{2ab}-\dfrac{4a^2b}{2ab}+\dfrac{6ab^2}{2ab}$

$=-6ab-2a+3b$

(14) $\left(-6xy^2-x^2y+\dfrac{1}{2}x\right)\div\left(-\dfrac{1}{2}x\right)$

$=\left(-6xy^2-x^2y+\dfrac{1}{2}x\right)\times\left(-\dfrac{2}{x}\right)$

L- 37

(1) $x-7y$
(2) $-5x^2-x$
(3) $3a+b+3$
(4) $3x+y+2$
(5) $-2a^2-4a$
(6) $-a+2b+1$
(7) $5x$
(8) $6a-6b+4$
(9) x^2-3
(10) $9a^2-12a$
(11) $-5x+14xy-3$

〈풀이〉

(1) $\frac{6x^2+4xy}{-2x}-\frac{15y^2-12xy}{3y}$
$=-3x-2y-5y+4x=x-7y$

(2) $-\frac{2x^3+5x^2}{x}-\frac{9x^2y-12xy}{3y}$
$=-2x^2-5x-3x^2+4x=-5x^2-x$

(3) $\frac{4a^2+6ab}{2a}+\frac{15b+5ab-10b^2}{5b}$
$=2a+3b+3+a-2b$
$=3a+b+3$

(4) $\frac{3xy-9y^2+6y}{3y}-\frac{8x^2+16xy}{-4x}$
$=x-3y+2+2x+4y$
$=3x+y+2$

(5) $-\frac{6a^3+2a^2-4a}{2a}+\frac{a^4-3a^3-2a^2}{a^2}$
$=-3a^2-a+2+a^2-3a-2$
$=-2a^2-4a$

(6) $(5a^2+10ab)\div 5a+(4a^2-2a)\div(-2a)$
$=\frac{5a^2+10ab}{5a}+\frac{4a^2-2a}{-2a}$
$=a+2b-2a+1$
$=-a+2b+1$

(7) $(4x^2y+8xy^2)\div 2xy-(9x^2y-12xy^2)\div(-3xy)$
$=\frac{4x^2y+8xy^2}{2xy}-\frac{9x^2y-12xy^2}{-3xy}$
$=2x+4y+3x-4y$
$=5x$

(8) $-(12a^2-16a)\div 4a+(3ab-2b^2)\div\frac{1}{3}b$
$=\frac{-(12a^2-16a)}{4a}+(3ab-2b^2)\times\frac{3}{b}$
$=-3a+4+9a-6b$
$=6a-6b+4$

(9) $(x^2y-xy)\div\frac{1}{2}y+(2x^2y-4xy+6y)\div(-2y)$
$=(x^2y-xy)\times\frac{2}{y}+\frac{2x^2y-4xy+6y}{-2y}$
$=2x^2-2x-x^2+2x-3$
$=x^2-3$

(10) $(a^2x-ax)\div\frac{1}{3}x-(3ay-2a^2y)\div\frac{1}{3}y$
$=(a^2x-ax)\times\frac{3}{x}-(3ay-2a^2y)\times\frac{3}{y}$
$=3a^2-3a-9a+6a^2$
$=9a^2-12a$

(11) $-(xy+2xy^2)\div\left(-\frac{1}{4}y\right)-(3x^2-2x^2y+x)\div\frac{1}{3}x$
$=-(xy+2xy^2)\times\left(-\frac{4}{y}\right)-(3x^2-2x^2y+x)\times\frac{3}{x}$
$=4x+8xy-9x+6xy-3$
$=-5x+14xy-3$

L- 38

(1) $-8y^2-9y$
(2) $-2ab+\frac{4}{3}a$
(3) $4x^2-12xy-24x$
(4) $2a^2+\frac{3}{2}ab-4a$
(5) $3a+6$
(6) $-5x+3y-2$
(7) $8a-12$
(8) $6x-8y^2-10$
(9) $-11a^2+3a$
(10) $\frac{7}{2}x^2-4xy$
(11) $-6a^2-3ab+14a$
(12) $-3x+4$
(13) $-b$
(14) $2y$

〈풀이〉

(1) $-y(8y+9)$
$=-y\times 8y-y\times 9$
$=-8y^2-9y$

(2) $(-3b+2)\times\frac{2}{3}a$
$=-3b\times\frac{2}{3}a+2\times\frac{2}{3}a$
$=-2ab+\frac{4}{3}a$

(3) $(-x+3y+6)\times(-4x)$
$=-x\times(-4x)+3y\times(-4x)+6\times(-4x)$
$=4x^2-12xy-24x$

(4) $\frac{1}{2}a(4a+3b-8)$
$=\frac{1}{2}a\times 4a+\frac{1}{2}a\times 3b+\frac{1}{2}a\times(-8)$
$=2a^2+\frac{3}{2}ab-4a$

(5) $(6a^2+12a)\div 2a$
$=\frac{6a^2+12a}{2a}$
$=\frac{6a^2}{2a}+\frac{12a}{2a}$
$=3a+6$

(6) $(15x^2y-9xy^2+6xy)\div(-3xy)$

$=\dfrac{15x^2y-9xy^2+6xy}{-3xy}$

$=\dfrac{15x^2y}{-3xy}-\dfrac{9xy^2}{-3xy}+\dfrac{6xy}{-3xy}$

$=-5x+3y-2$

(7) $(-2ab+3b)\div\left(-\dfrac{1}{4}b\right)$

$=(-2ab+3b)\times\left(-\dfrac{4}{b}\right)$

$=-2ab\times\left(-\dfrac{4}{b}\right)+3b\times\left(-\dfrac{4}{b}\right)$

$=8a-12$

(8) $(3x^2-4xy^2-5x)\div\dfrac{1}{2}x$

$=(3x^2-4xy^2-5x)\times\dfrac{2}{x}$

$=3x^2\times\dfrac{2}{x}-4xy^2\times\dfrac{2}{x}-5x\times\dfrac{2}{x}$

$=6x-8y^2-10$

(9) $3a(-a-3)-4a(2a-3)=-3a^2-9a-8a^2+12a$

$=-11a^2+3a$

(10) $x(3x-2y)+3x\left(\dfrac{1}{6}x-\dfrac{2}{3}y\right)$

$=3x^2-2xy+\dfrac{1}{2}x^2-2xy$

$=\dfrac{7}{2}x^2-4xy$

(11) $-\dfrac{1}{2}a(4a+6b-12)+4a(-a+2)$

$=-2a^2-3ab+6a-4a^2+8a$

$=-6a^2-3ab+14a$

(12) $\dfrac{-2xy+6y}{2y}+\dfrac{-14x^2+7x}{7x}$

$=-x+3-2x+1$

$=-3x+4$

(13) $(9a^2-6ab)\div3a+(6a^2-2ab)\div(-2a)$

$=\dfrac{9a^2-6ab}{3a}+\dfrac{6a^2-2ab}{-2a}$

$=3a-2b-3a+b$

$=-b$

(14) $(8x^2-24xy)\div(-4x)+(xy-2y^2)\div\dfrac{1}{2}y$

$=\dfrac{8x^2-24xy}{-4x}+(xy-2y^2)\times\dfrac{2}{y}$

$=-2x+6y+2x-4y$

$=2y$

L- 39

(1) $-\dfrac{3}{2}a^2+2ab$ (2) $-4x^2-18xy-2x$

(3) $-a+5b$ (4) $2x^2+4x-3$

(5) $-15ax-27ay$ (6) $\dfrac{8}{3}a+6b$

(7) $-4x^3y+6x^2y-2xy^2$ (8) $4b^2-6b-8ab$

(9) $x^2+13x+8$ (10) $-4a^3+8a^2$

(11) $-8x+3y$ (12) $-2a+2b$

(13) $2x^2-6y^2$ (14) $2a-6b$

〈풀이〉

(1) $-\dfrac{1}{4}a(6a-8b)=-\dfrac{1}{4}a\times6a-\dfrac{1}{4}a\times(-8b)$

$=-\dfrac{3}{2}a^2+2ab$

(2) $2x(-2x-9y-1)$

$=2x\times(-2x)+2x\times(-9y)+2x\times(-1)$

$=-4x^2-18xy-2x$

(3) $(5a^2-25ab)\div(-5a)=\dfrac{5a^2-25ab}{-5a}$

$=\dfrac{5a^2}{-5a}-\dfrac{25ab}{-5a}$

$=-a+5b$

(4) $(2x^3+4x^2-3x)\div x=\dfrac{2x^3+4x^2-3x}{x}$

$=\dfrac{2x^3}{x}+\dfrac{4x^2}{x}-\dfrac{3x}{x}$

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

(5) $(-5x-9y)\times3a$

$=-5x\times3a-9y\times3a$

$=-15ax-27ay$

(6) $(4ab+9b^2)\div\dfrac{3}{2}b$

$=(4ab+9b^2)\times\dfrac{2}{3b}$

$=4ab\times\dfrac{2}{3b}+9b^2\times\dfrac{2}{3b}$

$=\dfrac{8}{3}a+6b$

(7) $(10x^2-15x+5y)\times\left(-\dfrac{2}{5}xy\right)$

$=10x^2\times\left(-\dfrac{2}{5}xy\right)-15x\times\left(-\dfrac{2}{5}xy\right)$

$+5y\times\left(-\dfrac{2}{5}xy\right)$

$=-4x^3y+6x^2y-2xy^2$

(8) $(-2ab+3a+4a^2)\div\left(-\frac{a}{2b}\right)$

$=(-2ab+3a+4a^2)\times\left(-\frac{2b}{a}\right)$

$=-2ab\times\left(-\frac{2b}{a}\right)+3a\times\left(-\frac{2b}{a}\right)+4a^2\times\left(-\frac{2b}{a}\right)$

$=4b^2-6b-8ab$

(9) $-7x(x-3)+8(x^2-x+1)$

$=-7x^2+21x+8x^2-8x+8$

$=x^2+13x+8$

(10) $(a+3)\times(-2a^2)-2a(a^2-7a)$

$=-2a^3-6a^2-2a^3+14a^2$

$=-4a^3+8a^2$

(11) $\frac{4xy^2-10x^2y}{2xy}+\frac{4y^2-12xy}{4y}$

$=2y-5x+y-3x$

$=-8x+3y$

(12) $(10b^2-8ab)\div 2b+(6a^2-9ab)\div 3a$

$=\frac{10b^2-8ab}{2b}+\frac{6a^2-9ab}{3a}$

$=5b-4a+2a-3b$

$=-2a+2b$

(13) $\frac{2}{3}x(3x-6y)+\left(\frac{1}{2}x-\frac{3}{4}y\right)\times 8y$

$=2x^2-4xy+4xy-6y^2$

$=2x^2-6y^2$

(14) $(8a^2b-3ab^2)\div\left(-\frac{1}{2}ab\right)-(8ab^2-12a^2b)\div\frac{2}{3}ab$

$=(8a^2b-3ab^2)\times\left(-\frac{2}{ab}\right)$

$-(8ab^2-12a^2b)\times\frac{3}{2ab}$

$=-16a+6b-12b+18a$

$=2a-6b$

L- 40

(1) $3a^2b-2a^3b$	(2) x
(3) $6ab-3a$	(4) $3y+8xy$
(5) $-\frac{4}{3}a-3$	(6) $-6x^3y+8x^4$
(7) $2ab^2-b^2$	(8) $7x^2$
(9) $-9a-b$	(10) $5x$

〈풀이〉

(1) $(9a^2b^2-6a^3b^2)\div 6ab^2\times 2ab$

$=\left(\frac{3}{2}a-a^2\right)\times 2ab$

$=3a^2b-2a^3b$

(2) $x(2x-3)-(2x^3y-4x^2y)\div xy$

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

$=x$

(3) $\frac{1}{2}a(3b-2)+(9a^2b-4a^2)\div 2a$

$=\frac{3}{2}ab-a+\frac{9}{2}ab-2a$

$=6ab-3a$

(4) $(2xy+3x^2y)\div\frac{1}{4}x-(4x+5)\times y$

$=8y+12xy-4xy-5y$

$=3y+8xy$

(5) $\{(a-4)\times 3a-a(7a-3)\}\div 3a$

$=\frac{(a-4)\times 3a-a(7a-3)}{3a}$

$=\frac{3a^2-12a-7a^2+3a}{3a}$

$=\frac{-4a^2-9a}{3a}$

$=-\frac{4}{3}a-3$

(6) $(3y^2-4xy)\div 4y\times(-2x)^3$

$=\left(\frac{3}{4}y-x\right)\times(-8x^3)$

$=-6x^3y+8x^4$

(7) $4b(ab-b)+(2ab^3-3b^3)\div(-b)$

$=4ab^2-4b^2-2ab^2+3b^2$

$=2ab^2-b^2$

(8) $3x\left(3x-\frac{2}{3}y\right)-(x^3y-x^2y^2)\div\frac{1}{2}xy$

$=9x^2-2xy-2x^2+2xy$

$=7x^2$

(9) $-(5a^2b-4ab^2)\div ab-\left(\frac{5}{a}+\frac{4}{b}\right)\times ab$

$=-5a+4b-5b-4a$

$=-9a-b$

(10) $\frac{4x^3-6x^2}{2x}+\{3x^2-x(5x-2)+6x\}$

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

$=2x^2-3x+(-2x^2+8x)$

$=2x^2-3x-2x^2+8x$

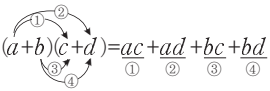
$=5x$

L- 41

(1) $ab-3a+2b-6$
(2) $ab+3a-2b-6$
(3) $ab-3a-2b+6$
(4) $ac-ad+bc-bd$
(5) $ac+ad-bc-bd$
(6) $ac-ad-bc+bd$
(7) $xy+5x+3y+15$
(8) $xy-4x+7y-28$
(9) $xy+9x-2y-18$
(10) $xy-6x-8y+48$
(11) $ax+ay+bx+by$
(12) $ax-ay+bx-by$
(13) $ax+ay-bx-by$
(14) $ax-ay-bx+by$

〈풀이〉

※ 분배법칙을 이용하여 주어진 식을 전개한다.



(1) $(a+2)(b-3)$
$=a\times b+a\times(-3)+2\times b+2\times(-3)$
$=ab-3a+2b-6$

(2) $(a-2)(b+3)$
$=a\times b+a\times 3-2\times b-2\times 3$
$=ab+3a-2b-6$

(3) $(a-2)(b-3)$
$=a\times b+a\times(-3)-2\times b-2\times(-3)$
$=ab-3a-2b+6$

(4) $(a+b)(c-d)$
$=a\times c+a\times(-d)+b\times c+b\times(-d)$
$=ac-ad+bc-bd$

(5) $(a-b)(c+d)$
$=a\times c+a\times d-b\times c-b\times d$
$=ac+ad-bc-bd$

(6) $(a-b)(c-d)$
$=a\times c+a\times(-d)-b\times c-b\times(-d)$
$=ac-ad-bc+bd$

(7) $(x+3)(y+5)$
$=x\times y+x\times 5+3\times y+3\times 5$
$=xy+5x+3y+15$

(8) $(x+7)(y-4)$
$=x\times y+x\times(-4)+7\times y+7\times(-4)$
$=xy-4x+7y-28$

(9) $(x-2)(y+9)$
$=x\times y+x\times 9-2\times y-2\times 9$
$=xy+9x-2y-18$

(10) $(x-8)(y-6)$
$=x\times y+x\times(-6)-8\times y-8\times(-6)$
$=xy-6x-8y+48$

(11) $(a+b)(x+y)$
$=a\times x+a\times y+b\times x+b\times y$
$=ax+ay+bx+by$

(12) $(a+b)(x-y)$
$=a\times x+a\times(-y)+b\times x+b\times(-y)$
$=ax-ay+bx-by$

(13) $(a-b)(x+y)$
$=a\times x+a\times y-b\times x-b\times y$
$=ax+ay-bx-by$

(14) $(a-b)(x-y)$
$=a\times x+a\times(-y)-b\times x-b\times(-y)$
$=ax-ay-bx+by$

L- 42

(1) $2ab+3a+8b+12$
(2) $3xy-6x+y-2$
(3) $6ab+2a-9b-3$
(4) $5xy-2x-10y+4$
(5) $2ab+8a+3b+12$
(6) $8xy-4x+2y-1$
(7) $3ac+ad+3bc+bd$
(8) $2ac-4ad+bc-2bd$
(9) $ac+ad-4bc-4bd$
(10) $6ac-3ad-4bc+2bd$
(11) $ax-4ay+bx-4by$
(12) $8ax-20ay-2bx+5by$
(13) $ax+3ay+5bx+15by$
(14) $6ax+4ay-12bx-8by$

〈풀이〉

(1) $(a+4)(2b+3)$
$=a\times 2b+a\times 3+4\times 2b+4\times 3$
$=2ab+3a+8b+12$

(2) $(3x+1)(y-2)$
$=3x\times y+3x\times(-2)+1\times y+1\times(-2)$
$=3xy-6x+y-2$

(3) $(2a-3)(3b+1)$
$=2a\times 3b+2a\times 1-3\times 3b-3\times 1$
$=6ab+2a-9b-3$

(4) $(x-2)(5y-2)$
$=x\times 5y+x\times(-2)-2\times 5y-2\times(-2)$
$=5xy-2x-10y+4$

(5) $(2a+3)(b+4)$
$=2a\times b+2a\times 4+3\times b+3\times 4$
$=2ab+8a+3b+12$

(6) $(4x+1)(2y-1)$
$=4x\times 2y+4x\times(-1)+1\times 2y+1\times(-1)$
$=8xy-4x+2y-1$

(7) $(a+b)(3c+d)$
$=a\times3c+a\times d+b\times3c+b\times d$
$=3ac+ad+3bc+bd$
(8) $(2a+b)(c-2d)$
$=2a\times c+2a\times(-2d)+b\times c+b\times(-2d)$
$=2ac-4ad+bc-2bd$
(9) $(a-4b)(c+d)$
$=a\times c+a\times d-4b\times c-4b\times d$
$=ac+ad-4bc-4bd$
(10) $(3a-2b)(2c-d)$
$=3a\times2c+3a\times(-d)-2b\times2c-2b\times(-d)$
$=6ac-3ad-4bc+2bd$
(11) $(a+b)(x-4y)$
$=a\times x+a\times(-4y)+b\times x+b\times(-4y)$
$=ax-4ay+bx-4by$
(12) $(4a-b)(2x-5y)$
$=4a\times2x+4a\times(-5y)-b\times2x-b\times(-5y)$
$=8ax-20ay-2bx+5by$
(13) $(a+5b)(x+3y)$
$=a\times x+a\times3y+5b\times x+5b\times3y$
$=ax+3ay+5bx+15by$
(14) $(2a-4b)(3x+2y)$
$=2a\times3x+2a\times2y-4b\times3x-4b\times2y$
$=6ax+4ay-12bx-8by$

L- 43

(1) a^2+2a-3
(2) $a^2-7a+10$
(3) $a^2+14a+48$
(4) x^2-2x-8
(5) $x^2-5x-36$
(6) $x^2-12x+27$
(7) a^2+a-42
(8) $3x^2-x-10$
(9) $2b^2+18b+36$
(10) $6y^2-25y+24$
(11) $3x^2+9x-12$
(12) $20a^2-16a-36$
(13) $y^2-13y+40$
(14) $5b^2+51b+54$

〈풀이〉
※ 분배법칙을 이용하여 주어진 식을 전개한 다음 동류항이 있으면 동류항을 모아서 간단히 한다.
(1) $(a-1)(a+3)$
$=a\times a+a\times3-1\times a-1\times3$
$=a^2+3a-a-3$
$=a^2+2a-3$
(2) $(a-5)(a-2)$
$=a\times a+a\times(-2)-5\times a-5\times(-2)$
$=a^2-2a-5a+10$
$=a^2-7a+10$
(3) $(a+6)(a+8)$
$=a\times a+a\times8+6\times a+6\times8$
$=a^2+8a+6a+48$
$=a^2+14a+48$
(4) $(x+2)(x-4)$
$=x\times x+x\times(-4)+2\times x+2\times(-4)$
$=x^2-4x+2x-8$
$=x^2-2x-8$
(5) $(x-9)(x+4)$
$=x\times x+x\times4-9\times x-9\times4$
$=x^2+4x-9x-36$
$=x^2-5x-36$
(6) $(x-3)(x-9)$
$=x\times x+x\times(-9)-3\times x-3\times(-9)$
$=x^2-9x-3x+27$
$=x^2-12x+27$
(7) $(a+7)(a-6)$
$=a\times a+a\times(-6)+7\times a+7\times(-6)$
$=a^2-6a+7a-42$
$=a^2+a-42$
(8) $(x-2)(3x+5)$
$=x\times3x+x\times5-2\times3x-2\times5$
$=3x^2+5x-6x-10$
$=3x^2-x-10$
(9) $(2b+6)(b+6)$
$=2b\times b+2b\times6+6\times b+6\times6$
$=2b^2+12b+6b+36$
$=2b^2+18b+36$
(10) $(3y-8)(2y-3)$
$=3y\times2y+3y\times(-3)-8\times2y-8\times(-3)$
$=6y^2-9y-16y+24$
$=6y^2-25y+24$
(11) $(3x-3)(x+4)$
$=3x\times x+3x\times4-3\times x-3\times4$
$=3x^2+12x-3x-12$
$=3x^2+9x-12$
(12) $(4a+4)(5a-9)$
$=4a\times5a+4a\times(-9)+4\times5a+4\times(-9)$
$=20a^2-36a+20a-36$
$=20a^2-16a-36$
(13) $(y-5)(y-8)$
$=y\times y+y\times(-8)-5\times y-5\times(-8)$
$=y^2-8y-5y+40$
$=y^2-13y+40$
(14) $(b+9)(5b+6)$
$=b\times5b+b\times6+9\times5b+9\times6$
$=5b^2+6b+45b+54$
$=5b^2+51b+54$

L- 44

(1) $2ab-7a+4b-14$
(2) $-3ax+2ay-9bx+6by$
(3) $-2a^2+19a-9$ (4) $3xy+15x+5y+25$
(5) $-ac+ad-bc+bd$ (6) $-8x^2+12x+8$
(7) $-xy+2x+4y-8$
(8) $-12ac-6ad-2bc-bd$
(9) $-4y^2-7y-3$ (10) $10ab+12a-5b-6$
(11) $3ax-6ay-2bx+4by$
(12) $b^2-2b-35$ (13) $-2a^2+10ab-8b^2$
(14) $-9x^2+16y^2$

〈풀이〉

(1) $(a+2)(2b-7)$
$=a\times2b+a\times(-7)+2\times2b+2\times(-7)$
$=2ab-7a+4b-14$

(2) $(-a-3b)(3x-2y)$
$=-a\times3x-a\times(-2y)-3b\times3x-3b\times(-2y)$
$=-3ax+2ay-9bx+6by$

(3) $(a-9)(-2a+1)$
$=a\times(-2a)+a\times1-9\times(-2a)-9\times1$
$=-2a^2+a+18a-9$
$=-2a^2+19a-9$

(4) $(-3x-5)(-y-5)$
$=-3x\times(-y)-3x\times(-5)-5\times(-y)-5\times(-5)$
$=3xy+15x+5y+25$

(5) $(a+b)(-c+d)$
$=a\times(-c)+a\times d+b\times(-c)+b\times d$
$=-ac+ad-bc+bd$

(6) $(-4x+8)(2x+1)$
$=-4x\times2x-4x\times1+8\times2x+8\times1$
$=-8x^2-4x+16x+8$
$=-8x^2+12x+8$

(7) $(-x+4)(y-2)$
$=-x\times y-x\times(-2)+4\times y+4\times(-2)$
$=-xy+2x+4y-8$

(8) $(6a+b)(-2c-d)$
$=6a\times(-2c)+6a\times(-d)+b\times(-2c)+b\times(-d)$
$=-12ac-6ad-2bc-bd$

(9) $(-4y-3)(y+1)$
$=-4y\times y-4y\times1-3\times y-3\times1$
$=-4y^2-4y-3y-3$
$=-4y^2-7y-3$

(10) $(2a-1)(5b+6)$
$=2a\times5b+2a\times6-1\times5b-1\times6$
$=10ab+12a-5b-6$

(11) $(-3a+2b)(-x+2y)$
$=-3a\times(-x)-3a\times2y+2b\times(-x)+2b\times2y$
$=3ax-6ay-2bx+4by$

(12) $(b-7)(b+5)$
$=b\times b+b\times5-7\times b-7\times5$
$=b^2+5b-7b-35$
$=b^2-2b-35$

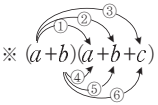
(13) $(a-b)(-2a+8b)$
$=a\times(-2a)+a\times8b-b\times(-2a)-b\times8b$
$=-2a^2+8ab+2ab-8b^2$
$=-2a^2+10ab-8b^2$

(14) $(-3x-4y)(3x-4y)$
$=-3x\times3x-3x\times(-4y)-4y\times3x-4y\times(-4y)$
$=-9x^2+12xy-12xy+16y^2$
$=-9x^2+16y^2$

L- 45

(1) $ax-ay+a-bx+by-b$
(2) $3ax-bx-2cx+6ay-2by-4cy$
(3) $a^2+2ab+4a+2b+3$
(4) $2x^2+3xy-2x-2y^2+y$
(5) $2a^3+5a^2+a-3$
(6) $2ax+2ay-3bx-3by+x+y$
(7) $ax-2bx-ay+2by-az+2bz$
(8) $3x^2+8x+6xy-2y-3$
(9) $2a^2+5ab+3b^2-2ac-3bc$
(10) $3x^3-5x^2+5x-2$
(11) $2a^2+ab+7a-b^2-2b+3$

〈풀이〉

※ $(a+b)(a+b+c)$ 

(3) $(a+1)(a+2b+3)$
$=a^2+2ab+3a+a+2b+3$
$=a^2+2ab+4a+2b+3$

(4) $(2x-y)(x+2y-1)$
$=2x^2+4xy-2x-xy-2y^2+y$
$=2x^2+3xy-2x-2y^2+y$

(5) $(2a+3)(a^2+a-1)$
$=2a^3+2a^2-2a+3a^2+3a-3$
$=2a^3+5a^2+a-3$

(8) $(x+2y+3)(3x-1)$
$=3x^2-x+6xy-2y+9x-3$
$=3x^2+8x+6xy-2y-3$

(9) $(a+b-c)(2a+3b)$
$=2a^2+3ab+2ab+3b^2-2ac-3bc$
$=2a^2+5ab+3b^2-2ac-3bc$

(10) $(x^2-x+1)(3x-2)$
$=3x^3-2x^2-3x^2+2x+3x-2$
$=3x^3-5x^2+5x-2$
(11) $(a+b+3)(2a-b+1)$
$=2a^2-ab+a+2ab-b^2+b+6a-3b+3$
$=2a^2+ab+7a-b^2-2b+3$

L - 46

(1) $b, c, c, 2bc$
(2) $x^2+2xy+y^2$
(3) $c^2+2cd+d^2$
(4) $y^2+2yz+z^2$
(5) $a, a, a^2, 2a$
(6) $x^2+12x+36$
(7) $b^2+8b+16$
(8) $y^2+16y+64$
(9) a^2+4a+4
(10) $x^2+14x+49$
(11) $4b^2+20b+25$
(12) $9y^2+12y+4$
(13) $16c^2+24c+9$
(14) $a^2+6ab+9b^2$
(15) $x^2+12xy+36y^2$
(16) $16b^2+8bc+c^2$
(17) $64y^2+16yz+z^2$
(18) $4c^2+12cd+9d^2$

〈풀이〉

※ $(a+b)^2=(a+b)(a+b)$
$=a^2+ab+ab+b^2$
$=a^2+2ab+b^2$
(2) $(x+y)^2=x^2+2\times x\times y+y^2$
$=x^2+2xy+y^2$
(3) $(c+d)^2=c^2+2\times c\times d+d^2$
$=c^2+2cd+d^2$
(4) $(y+z)^2=y^2+2\times y\times z+z^2$
$=y^2+2yz+z^2$
(6) $(x+6)^2=x^2+2\times x\times 6+6^2$
$=x^2+12x+36$
(7) $(b+4)^2=b^2+2\times b\times 4+4^2$
$=b^2+8b+16$
(8) $(y+8)^2=y^2+2\times y\times 8+8^2$
$=y^2+16y+64$
(9) $(a+2)^2=a^2+2\times a\times 2+2^2$
$=a^2+4a+4$
(10) $(x+7)^2=x^2+2\times x\times 7+7^2$
$=x^2+14x+49$
(11) $(2b+5)^2=(2b)^2+2\times 2b\times 5+5^2$
$=4b^2+20b+25$
(12) $(3y+2)^2=(3y)^2+2\times 3y\times 2+2^2$
$=9y^2+12y+4$
(13) $(4c+3)^2=(4c)^2+2\times 4c\times 3+3^2$
$=16c^2+24c+9$
(14) $(a+3b)^2=a^2+2\times a\times 3b+(3b)^2$
$=a^2+6ab+9b^2$
(15) $(x+6y)^2=x^2+2\times x\times 6y+(6y)^2$
$=x^2+12xy+36y^2$
(16) $(4b+c)^2=(4b)^2+2\times 4b\times c+c^2$
$=16b^2+8bc+c^2$
(17) $(8y+z)^2=(8y)^2+2\times 8y\times z+z^2$
$=64y^2+16yz+z^2$
(18) $(2c+3d)^2=(2c)^2+2\times 2c\times 3d+(3d)^2$
$=4c^2+12cd+9d^2$

L - 47

(1) $b, c, c, 2bc$
(2) $x^2-2xy+y^2$
(3) $c^2-2cd+d^2$
(4) $y^2-2yz+z^2$
(5) $a, a, a^2, 10a$
(6) x^2-6x+9
(7) b^2-2b+1
(8) $y^2-14y+49$
(9) $a^2-8a+16$
(10) $x^2-16x+64$
(11) $9b^2-6b+1$
(12) $4y^2-24y+36$
(13) $16c^2-16c+4$
(14) $a^2-4ab+4b^2$
(15) $x^2-10xy+25y^2$
(16) $36b^2-12bc+c^2$
(17) $16y^2-8yz+z^2$
(18) $9c^2-24cd+16d^2$

〈풀이〉

※ $(a-b)^2=(a-b)(a-b)$
$=a^2-ab-ab+b^2$
$=a^2-2ab+b^2$
(2) $(x-y)^2=x^2-2\times x\times y+y^2$
$=x^2-2xy+y^2$
(3) $(c-d)^2=c^2-2\times c\times d+d^2$
$=c^2-2cd+d^2$
(4) $(y-z)^2=y^2-2\times y\times z+z^2$
$=y^2-2yz+z^2$
(6) $(x-3)^2=x^2-2\times x\times 3+3^2$
$=x^2-6x+9$
(7) $(b-1)^2=b^2-2\times b\times 1+1^2$
$=b^2-2b+1$
(8) $(y-7)^2=y^2-2\times y\times 7+7^2$
$=y^2-14y+49$
(9) $(a-4)^2=a^2-2\times a\times 4+4^2$
$=a^2-8a+16$
(10) $(x-8)^2=x^2-2\times x\times 8+8^2$
$=x^2-16x+64$
(11) $(3b-1)^2=(3b)^2-2\times 3b\times 1+1^2$
$=9b^2-6b+1$
(12) $(2y-6)^2=(2y)^2-2\times 2y\times 6+6^2$
$=4y^2-24y+36$
(13) $(4c-2)^2=(4c)^2-2\times 4c\times 2+2^2$
$=16c^2-16c+4$

(14) $(a-2b)^2=a^2-2\times a\times 2b+(2b)^2$
$=a^2-4ab+4b^2$
(15) $(x-5y)^2=x^2-2\times x\times 5y+(5y)^2$
$=x^2-10xy+25y^2$
(16) $(6b-c)^2=(6b)^2-2\times 6b\times c+c^2$
$=36b^2-12bc+c^2$
(17) $(4y-z)^2=(4y)^2-2\times 4y\times z+z^2$
$=16y^2-8yz+z^2$
(18) $(3c-4d)^2=(3c)^2-2\times 3c\times 4d+(4d)^2$
$=9c^2-24cd+16d^2$

L - 48

(1) $b^2-2bc+c^2$
(2) $x^2-2xy+y^2$
(3) a^2-4a+4
(4) $x^2-10x+25$
(5) $b^2+2bc+c^2$
(6) $x^2+2xy+y^2$
(7) $a^2+8a+16$
(8) x^2+6x+9
(9) $9a^2-6a+1$
(10) $16x^2-16x+4$
(11) $a^2-8ab+16b^2$
(12) $49x^2-14xy+y^2$
(13) $4b^2-20bc+25c^2$
(14) $9a^2+24a+16$
(15) $4x^2+36x+81$
(16) $a^2+4ab+4b^2$
(17) $25x^2+10xy+y^2$
(18) $16b^2+56bc+49c^2$

〈풀이〉

※ $(-a+b)^2=(-a+b)(-a+b)$
$=a^2-ab-ab+b^2$
$=a^2-2ab+b^2$
$\therefore (a-b)^2=(-a+b)^2$
또한, $(a+b)^2=(-a-b)^2$
(1) $(-b+c)^2=\{(-b)+c\}^2$
$=(-b)^2+2\times(-b)\times c+c^2$
$=b^2-2bc+c^2$
(2) $(-x+y)^2=(-x)^2+2\times(-x)\times y+y^2$
$=x^2-2xy+y^2$
(3) $(-a+2)^2=(-a)^2+2\times(-a)\times 2+2^2$
$=a^2-4a+4$
(4) $(-x+5)^2=(-x)^2+2\times(-x)\times 5+5^2$
$=x^2-10x+25$
(5) $(-b-c)^2=\{(-b)-c\}^2$
$=(-b)^2-2\times(-b)\times c+c^2$
$=b^2+2bc+c^2$
(6) $(-x-y)^2=(-x)^2-2\times(-x)\times y+y^2$
$=x^2+2xy+y^2$
(7) $(-a-4)^2=(-a)^2-2\times(-a)\times 4+4^2$
$=a^2+8a+16$
(8) $(-x-3)^2=(-x)^2-2\times(-x)\times 3+3^2$
$=x^2+6x+9$
(9) $(-3a+1)^2=(-3a)^2+2\times(-3a)\times 1+1^2$
$=9a^2-6a+1$
(10) $(-4x+2)^2=(-4x)^2+2\times(-4x)\times 2+2^2$
$=16x^2-16x+4$
(11) $(-a+4b)^2=(-a)^2+2\times(-a)\times 4b+(4b)^2$
$=a^2-8ab+16b^2$
(12) $(-7x+y)^2=(-7x)^2+2\times(-7x)\times y+y^2$
$=49x^2-14xy+y^2$
(13) $(-2b+5c)^2=(-2b)^2+2\times(-2b)\times 5c+(5c)^2$
$=4b^2-20bc+25c^2$
(14) $(-3a-4)^2=(-3a)^2-2\times(-3a)\times 4+4^2$
$=9a^2+24a+16$
(15) $(-2x-9)^2=(-2x)^2-2\times(-2x)\times 9+9^2$
$=4x^2+36x+81$
(16) $(-a-2b)^2=(-a)^2-2\times(-a)\times 2b+(2b)^2$
$=a^2+4ab+4b^2$
(17) $(-5x-y)^2=(-5x)^2-2\times(-5x)\times y+y^2$
$=25x^2+10xy+y^2$
(18) $(-4b-7c)^2=(-4b)^2-2\times(-4b)\times 7c+(7c)^2$
$=16b^2+56bc+49c^2$

L - 49

(1) $a^2+10a+25$
(2) $16x^2-16xy+4y^2$
(3) $9a^2-6ab+b^2$
(4) $36y^2+36y+9$
(5) $x^2+4xy+4y^2$
(6) $4a^2-28a+49$
(7) $y^2-12y+36$
(8) $4a^2+16ab+16b^2$
(9) $9x^2+24x+16$
(10) $4a^2-32ab+64b^2$
(11) $y^2-18y+81$
(12) $a^2+14ab+49b^2$
(13) $49a^2-14ab+b^2$
(14) x^2+4x+4
(15) $16a^2+24ab+9b^2$
(16) $25y^2-20y+4$

〈풀이〉

(1) $(a+5)^2=a^2+2\times a\times 5+5^2$
$=a^2+10a+25$
(2) $(4x-2y)^2=(4x)^2-2\times 4x\times 2y+(2y)^2$
$=16x^2-16xy+4y^2$
(3) $(-3a+b)^2=(-3a)^2+2\times(-3a)\times b+b^2$
$=9a^2-6ab+b^2$
(4) $(-6y-3)^2=(-6y)^2-2\times(-6y)\times 3+3^2$
$=36y^2+36y+9$
(5) $(x+2y)^2=x^2+2\times x\times 2y+(2y)^2$
$=x^2+4xy+4y^2$
(6) $(2a-7)^2=(2a)^2-2\times 2a\times 7+7^2$
$=4a^2-28a+49$
(7) $(-y+6)^2=(-y)^2+2\times(-y)\times 6+6^2$
$=y^2-12y+36$

(8) $(-2a-4b)^2=(-2a)^2-2\times(-2a)\times4b+(4b)^2$
$=4a^2+16ab+16b^2$
(9) $(3x+4)^2=(3x)^2+2\times3x\times4+4^2$
$=9x^2+24x+16$
(10) $(-2a+8b)^2=(-2a)^2+2\times(-2a)\times8b+(8b)^2$
$=4a^2-32ab+64b^2$
(11) $(y-9)^2=y^2-2\times y\times9+9^2$
$=y^2-18y+81$
(12) $(-a-7b)^2=(-a)^2-2\times(-a)\times7b+(7b)^2$
$=a^2+14ab+49b^2$
(13) $(7a-b)^2=(7a)^2-2\times7a\times b+b^2$
$=49a^2-14ab+b^2$
(14) $(-x-2)^2=(-x)^2-2\times(-x)\times2+2^2$
$=x^2+4x+4$
(15) $(4a+3b)^2=(4a)^2+2\times4a\times3b+(3b)^2$
$=16a^2+24ab+9b^2$
(16) $(-5y+2)^2=(-5y)^2+2\times(-5y)\times2+2^2$
$=25y^2-20y+4$

L - 50

(1) b^2-c^2 (2) x^2-y^2 (3) c^2-d^2
(4) y^2-z^2 (5) 1, 1 (6) x^2-9
(7) b^2-16 (8) y^2-49 (9) a^2-4
(10) x^2-36 (11) $25b^2-1$ (12) $64y^2-16$
(13) $36c^2-81$ (14) a^2-25b^2 (15) x^2-64y^2
(16) $4b^2-c^2$ (17) $9y^2-z^2$ (18) $49c^2-4d^2$

〈풀이〉

※ $(a+b)(a-b)=a^2-ab+ab-b^2$
$=a^2-b^2$
(6) $(x+3)(x-3)=x^2-3^2=x^2-9$
(7) $(b+4)(b-4)=b^2-4^2=b^2-16$
(8) $(y+7)(y-7)=y^2-7^2=y^2-49$
(9) $(a+2)(a-2)=a^2-2^2=a^2-4$
(10) $(x+6)(x-6)=x^2-6^2=x^2-36$
(11) $(5b+1)(5b-1)=(5b)^2-1^2=25b^2-1$
(12) $(8y+4)(8y-4)=(8y)^2-4^2=64y^2-16$
(13) $(6c+9)(6c-9)=(6c)^2-9^2=36c^2-81$
(14) $(a+5b)(a-5b)=a^2-(5b)^2=a^2-25b^2$
(15) $(x+8y)(x-8y)=x^2-(8y)^2=x^2-64y^2$
(16) $(2b+c)(2b-c)=(2b)^2-c^2=4b^2-c^2$
(17) $(3y+z)(3y-z)=(3y)^2-z^2=9y^2-z^2$
(18) $(7c+2d)(7c-2d)=(7c)^2-(2d)^2=49c^2-4d^2$

L - 51

(1) a^2-25 (2) $81-16x^2$ (3) a^2-4b^2
(4) $36x^2-9y^2$ (5) $64-x^2$ (6) $9a^2-1$
(7) $49x^2-y^2$ (8) $25a^2-4b^2$ (9) $4x^2-9$
(10) $16-49a^2$ (11) $25x^2-y^2$ (12) $16a^2-9b^2$
(13) $9a^2-25$ (14) y^2-36x^2 (15) $36-4b^2$
(16) $9y^2-64x^2$

〈풀이〉

(1) $(a+5)(a-5)=a^2-5^2=a^2-25$
(2) $(9+4x)(9-4x)=9^2-(4x)^2=81-16x^2$
(3) $(a+2b)(a-2b)=a^2-(2b)^2=a^2-4b^2$
(4) $(6x+3y)(6x-3y)=(6x)^2-(3y)^2=36x^2-9y^2$
(5) $(8-x)(8+x)=8^2-x^2=64-x^2$
(6) $(3a-1)(3a+1)=(3a)^2-1^2=9a^2-1$
(7) $(7x-y)(7x+y)=(7x)^2-y^2=49x^2-y^2$
(8) $(5a-2b)(5a+2b)=(5a)^2-(2b)^2=25a^2-4b^2$
(9) $(2x+3)(2x-3)=(2x)^2-3^2=4x^2-9$
(10) $(4-7a)(4+7a)=4^2-(7a)^2=16-49a^2$
(11) $(5x+y)(5x-y)=(5x)^2-y^2=25x^2-y^2$
(12) $(4a-3b)(4a+3b)=(4a)^2-(3b)^2=16a^2-9b^2$
(13) $(-3a+5)(-3a-5)=(-3a)^2-5^2=9a^2-25$
(14) $(6x+y)(y-6x)=(y+6x)(y-6x)$
$=y^2-(6x)^2$
$=y^2-36x^2$
(15) $(-2b+6)(2b+6)=(6-2b)(6+2b)$
$=6^2-(2b)^2$
$=36-4b^2$
(16) $(8x-3y)(-8x-3y)=(-3y+8x)(-3y-8x)$
$=(-3y)^2-(8x)^2$
$=9y^2-64x^2$

L - 52

(1) 3, 3, 5, 6 (2) $x^2+13x+42$
(3) x^2+6x+8 (4) $x^2+12x+32$
(5) $x^2+10x+21$ (6) $x^2+4x-21$
(7) $x^2-4x-21$ (8) $x^2-10x+21$
(9) $x^2+11x+24$ (10) $x^2-7x-18$
(11) x^2-x-20 (12) $x^2-12x+35$
(13) $x^2+3x-18$ (14) $x^2+8xy+15y^2$
(15) $x^2+6xy-16y^2$ (16) $x^2+4xy-5y^2$
(17) $x^2-16xy+63y^2$ (18) $x^2+2xy-24y^2$

〈풀이〉

※ $(x+a)(x+b)=x^2+bx+ax+ab$
$=x^2+(a+b)x+ab$

(2) $(x+6)(x+7)=x^2+(6+7)x+6\times7$
$=x^2+13x+42$

(3) $(x+4)(x+2)=x^2+(4+2)x+4\times2$
$=x^2+6x+8$

(4) $(x+8)(x+4)=x^2+(8+4)x+8\times4$
$=x^2+12x+32$

(5) $(x+7)(x+3)=x^2+(7+3)x+7\times3$
$=x^2+10x+21$

(6) $(x+7)(x-3)=x^2+\{7+(-3)\}x+7\times(-3)$
$=x^2+4x-21$

(7) $(x-7)(x+3)$
$=x^2+\{(-7)+3\}x+(-7)\times3$
$=x^2-4x-21$

(8) $(x-7)(x-3)$
$=x^2+\{(-7)+(-3)\}x+(-7)\times(-3)$
$=x^2-10x+21$

(9) $(x+3)(x+8)$
$=x^2+(3+8)x+3\times8$
$=x^2+11x+24$

(10) $(x+2)(x-9)$
$=x^2+\{2+(-9)\}x+2\times(-9)$
$=x^2-7x-18$

(11) $(x-5)(x+4)$
$=x^2+\{(-5)+4\}x+(-5)\times4$
$=x^2-x-20$

(12) $(x-7)(x-5)$
$=x^2+\{(-7)+(-5)\}x+(-7)\times(-5)$
$=x^2-12x+35$

(13) $(x+6)(x-3)$
$=x^2+\{6+(-3)\}x+6\times(-3)$
$=x^2+3x-18$

(14) $(x+5y)(x+3y)$
$=x^2+(5y+3y)x+5y\times3y$
$=x^2+8xy+15y^2$

(15) $(x+8y)(x-2y)$
$=x^2+\{8y+(-2y)\}x+8y\times(-2y)$
$=x^2+6xy-16y^2$

(16) $(x-y)(x+5y)$
$=x^2+\{(-y)+5y\}x+(-y)\times5y$
$=x^2+4xy-5y^2$

(17) $(x-9y)(x-7y)$
$=x^2+\{(-9y)+(-7y)\}x+(-9y)\times(-7y)$
$=x^2-16xy+63y^2$

(18) $(x-4y)(x+6y)$
$=x^2+\{(-4y)+6y\}x+(-4y)\times6y$
$=x^2+2xy-24y^2$

L-53

(1) x^2+3x+2
(2) $x^2+5x-24$
(3) $x^2+4x-21$
(4) $x^2-14x+45$
(5) $x^2+7xy+6y^2$
(6) $x^2-2xy-63y^2$
(7) $x^2+xy-30y^2$
(8) $x^2-10xy+16y^2$
(9) $x^2+3xy-28y^2$
(10) $x^2+11x+30$
(11) $x^2-17x+72$
(12) $x^2-5xy-14y^2$
(13) $x^2+5x-36$
(14) $x^2-9xy+18y^2$
(15) $x^2+9xy+14y^2$
(16) $x^2+3x-40$

〈풀이〉

(1) $(x+1)(x+2)=x^2+(1+2)x+1\times2$
$=x^2+3x+2$

(2) $(x+8)(x-3)=x^2+\{8+(-3)\}x+8\times(-3)$
$=x^2+5x-24$

(3) $(x-3)(x+7)=x^2+\{(-3)+7\}x+(-3)\times7$
$=x^2+4x-21$

(4) $(x-9)(x-5)=x^2+\{(-9)+(-5)\}x+(-9)\times(-5)$
$=x^2-14x+45$

(5) $(x+6y)(x+y)=x^2+(6y+y)x+6y\times y$
$=x^2+7xy+6y^2$

(6) $(x+7y)(x-9y)$
$=x^2+\{7y+(-9y)\}x+7y\times(-9y)$
$=x^2-2xy-63y^2$

(7) $(x-5y)(x+6y)$
$=x^2+\{(-5y)+6y\}x+(-5y)\times6y$
$=x^2+xy-30y^2$

(8) $(x-2y)(x-8y)$
$=x^2+\{(-2y)+(-8y)\}x+(-2y)\times(-8y)$
$=x^2-10xy+16y^2$

(9) $(x-4y)(x+7y)$
$=x^2+\{(-4y)+7y\}x+(-4y)\times7y$
$=x^2+3xy-28y^2$

(10) $(x+6)(x+5)=x^2+(6+5)x+6\times5$
$=x^2+11x+30$

(11) $(x-8)(x-9)=x^2+\{(-8)+(-9)\}x+(-8)\times(-9)$
$=x^2-17x+72$

(12) $(x+2y)(x-7y)$
$=x^2+\{2y+(-7y)\}x+2y\times(-7y)$
$=x^2-5xy-14y^2$

(13) $(x+9)(x-4)=x^2+\{9+(-4)\}x+9\times(-4)$
$=x^2+5x-36$

(14) $(x-3y)(x-6y)$
$=x^2+\{(-3y)+(-6y)\}x+(-3y)\times(-6y)$
$=x^2-9xy+18y^2$

(15) $(x+7y)(x+2y)=x^2+(7y+2y)x+7y\times2y$
$=x^2+9xy+14y^2$

(16) $(x-5)(x+8)=x^2+\{(-5)+8\}x+(-5)\times8$
$=x^2+3x-40$

L - 54

(1) 2, 2, 7, 6
(2) $3x^2+22x+7$
(3) $6x^2+11x+4$
(4) $6x^2+13x+5$
(5) $12x^2+17x+6$
(6) $12x^2-x-6$
(7) $12x^2+x-6$
(8) $12x^2-17x+6$
(9) $4x^2+10x+6$
(10) $8x^2+8x-48$
(11) $10x^2-14x-12$
(12) $6x^2-22x+12$
(13) $12x^2+5x-28$
(14) $5x^2+14xy+8y^2$
(15) $4x^2-3xy-10y^2$
(16) $10x^2+13xy-9y^2$
(17) $12x^2-15xy+3y^2$
(18) $8x^2+16xy-10y^2$

〈풀이〉

※ $(ax+b)(cx+d)=acx^2+adx+bcx+bd$
$=acx^2+(ad+bc)x+bd$

(2) $(x+7)(3x+1)$
$=(1\times3)x^2+(1\times1+7\times3)x+7\times1$
$=3x^2+22x+7$

(3) $(2x+1)(3x+4)$
$=(2\times3)x^2+(2\times4+1\times3)x+1\times4$
$=6x^2+11x+4$

(4) $(3x+5)(2x+1)$
$=(3\times2)x^2+(3\times1+5\times2)x+5\times1$
$=6x^2+13x+5$

(5) $(3x+2)(4x+3)$
$=(3\times4)x^2+(3\times3+2\times4)x+2\times3$
$=12x^2+17x+6$

(6) $(3x+2)(4x-3)$
$=(3\times4)x^2+\{3\times(-3)+2\times4\}x+2\times(-3)$
$=12x^2-x-6$

(7) $(3x-2)(4x+3)$
$=(3\times4)x^2+\{3\times3+(-2)\times4\}x+(-2)\times3$
$=12x^2+x-6$

(8) $(3x-2)(4x-3)$
$=(3\times4)x^2+\{3\times(-3)+(-2)\times4\}x+(-2)\times(-3)$
$=12x^2-17x+6$

(9) $(2x+3)(2x+2)$
$=(2\times2)x^2+(2\times2+3\times2)x+3\times2$
$=4x^2+10x+6$

(10) $(2x+6)(4x-8)$
$=(2\times4)x^2+\{2\times(-8)+6\times4\}x+6\times(-8)$
$=8x^2+8x-48$

(11) $(2x-4)(5x+3)$
$=(2\times5)x^2+\{2\times3+(-4)\times5\}x+(-4)\times3$
$=10x^2-14x-12$

(12) $(3x-2)(2x-6)$
$=(3\times2)x^2+\{3\times(-6)+(-2)\times2\}x+(-2)\times(-6)$
$=6x^2-22x+12$

(13) $(4x+7)(3x-4)$
$=(4\times3)x^2+\{4\times(-4)+7\times3\}x+7\times(-4)$
$=12x^2+5x-28$

(14) $(x+2y)(5x+4y)$
$=(1\times5)x^2+(1\times4y+2y\times5)x+2y\times4y$
$=5x^2+14xy+8y^2$

(15) $(4x+5y)(x-2y)$
$=(4\times1)x^2+\{4\times(-2y)+5y\times1\}x+5y\times(-2y)$
$=4x^2-3xy-10y^2$

(16) $(2x-y)(5x+9y)$
$=(2\times5)x^2+\{2\times9y+(-y)\times5\}x+(-y)\times9y$
$=10x^2+13xy-9y^2$

(17) $(3x-3y)(4x-y)$
$=(3\times4)x^2+\{3\times(-y)+(-3y)\times4\}x$
$+(-3y)\times(-y)$
$=12x^2-15xy+3y^2$

(18) $(4x-2y)(2x+5y)$
$=(4\times2)x^2+\{4\times5y+(-2y)\times2\}x+(-2y)\times5y$
$=8x^2+16xy-10y^2$

L - 55

(1) $6x^2+13x+6$
(2) $6x^2-13x-5$
(3) $8x^2+8x-6$
(4) $8x^2-18x+4$
(5) $10x^2+13xy+4y^2$
(6) $6x^2+xy-12y^2$
(7) $8x^2-14xy-15y^2$
(8) $15x^2-34xy+15y^2$
(9) $6x^2+5x-21$
(10) $4x^2+19xy+12y^2$
(11) $15x^2+x-6$
(12) $12x^2-20xy+7y^2$
(13) $-5x^2-13xy+6y^2$
(14) $6x^2+5x-4$
(15) $-20x^2-22xy-6y^2$
(16) $12x^2-29x+15$

〈풀이〉

(1) $(2x+3)(3x+2)$
$=(2\times3)x^2+(2\times2+3\times3)x+3\times2$
$=6x^2+13x+6$

(2) $(3x+1)(2x-5)$
$=(3\times2)x^2+\{3\times(-5)+1\times2\}x+1\times(-5)$
$=6x^2-13x-5$

(3) $(4x-2)(2x+3)$
$=(4\times2)x^2+\{4\times3+(-2)\times2\}x+(-2)\times3$
$=8x^2+8x-6$

(4) $(2x-4)(4x-1)$
$=(2\times4)x^2+\{2\times(-1)+(-4)\times4\}x+(-4)\times(-1)$
$=8x^2-18x+4$

(5) $(5x+4y)(2x+y)$
$=(5\times2)x^2+(5\times y+4y\times2)x+4y\times y$
$=10x^2+13xy+4y^2$
(6) $(2x+3y)(3x-4y)$
$=(2\times3)x^2+\{2\times(-4y)+3y\times3\}x+3y\times(-4y)$
$=6x^2+xy-12y^2$
(7) $(2x-5y)(4x+3y)$
$=(2\times4)x^2+\{2\times3y+(-5y)\times4\}x+(-5y)\times3y$
$=8x^2-14xy-15y^2$
(8) $(5x-3y)(3x-5y)$
$=(5\times3)x^2+\{5\times(-5y)+(-3y)\times3\}x$
$+(-3y)\times(-5y)$
$=15x^2-34xy+15y^2$
(9) $(2x-3)(3x+7)$
$=(2\times3)x^2+\{2\times7+(-3)\times3\}x+(-3)\times7$
$=6x^2+5x-21$
(10) $(4x+3y)(x+4y)$
$=(4\times1)x^2+\{4\times4y+3y\times1\}x+3y\times4y$
$=4x^2+19xy+12y^2$
(11) $(3x+2)(5x-3)$
$=(3\times5)x^2+\{3\times(-3)+2\times5\}x+2\times(-3)$
$=15x^2+x-6$
(12) $(6x-7y)(2x-y)$
$=(6\times2)x^2+\{6\times(-y)+(-7y)\times2\}x$
$+(-7y)\times(-y)$
$=12x^2-20xy+7y^2$
(13) $(-x-3y)(5x-2y)$
$=\{(-1)\times5\}x^2+\{(-1)\times(-2y)+(-3y)\times5\}x$
$+(-3y)\times(-2y)$
$=-5x^2-13xy+6y^2$
(14) $(-2x+1)(-3x-4)$
$=\{(-2)\times(-3)\}x^2+\{(-2)\times(-4)+1\times(-3)\}x$
$+1\times(-4)$
$=6x^2+5x-4$
(15) $(-4x-2y)(5x+3y)$
$=\{(-4)\times5\}x^2+\{(-4)\times3y+(-2y)\times5\}x$
$+(-2y)\times3y$
$=-20x^2-22xy-6y^2$
(16) $(-3x+5)(-4x+3)$
$=\{(-3)\times(-4)\}x^2+\{(-3)\times3+5\times(-4)\}x+5\times3$
$=12x^2-29x+15$

L-56

(1) $25a^2+20a+4$ (2) $x^2-8xy+16y^2$
(3) $4a^2-12ab+9b^2$ (4) $16x^2+8xy+y^2$
(5) $4x^2-25$ (6) a^2-16b^2
(7) $16x^2-9$ (8) $36b^2-25a^2$
(9) $x^2+11x+18$ (10) $x^2-2xy-35y^2$
(11) $x^2-2x-24$ (12) $x^2-9xy+20y^2$
(13) $4x^2+11x+6$ (14) $8x^2-14xy+5y^2$
(15) $-6x^2-5x+6$ (16) $10x^2+3xy-4y^2$

〈풀이〉

(1) $(5a+2)^2=(5a)^2+2\times5a\times2+2^2$
$=25a^2+20a+4$
(2) $(x-4y)^2=x^2-2\times x\times4y+(4y)^2$
$=x^2-8xy+16y^2$
(3) $(-2a+3b)^2$
$=(-2a)^2+2\times(-2a)\times3b+(3b)^2$
$=4a^2-12ab+9b^2$
(4) $(-4x-y)^2=(-4x)^2-2\times(-4x)\times y+y^2$
$=16x^2+8xy+y^2$
(5) $(2x+5)(2x-5)=(2x)^2-5^2=4x^2-25$
(6) $(a-4b)(a+4b)=a^2-(4b)^2=a^2-16b^2$
(7) $(-4x-3)(-4x+3)=(-4x)^2-3^2$
$=16x^2-9$
(8) $(5a+6b)(-5a+6b)=(6b+5a)(6b-5a)$
$=(6b)^2-(5a)^2$
$=36b^2-25a^2$
(9) $(x+9)(x+2)=x^2+(9+2)x+9\times2$
$=x^2+11x+18$
(10) $(x+5y)(x-7y)$
$=x^2+\{5y+(-7y)\}x+5y\times(-7y)$
$=x^2-2xy-35y^2$
(11) $(x-6)(x+4)$
$=x^2+\{(-6)+4\}x+(-6)\times4$
$=x^2-2x-24$
(12) $(x-4y)(x-5y)$
$=x^2+\{(-4y)+(-5y)\}x+(-4y)\times(-5y)$
$=x^2-9xy+20y^2$
(13) $(x+2)(4x+3)$
$=(1\times4)x^2+(1\times3+2\times4)x+2\times3$
$=4x^2+11x+6$
(14) $(2x-y)(4x-5y)$
$=(2\times4)x^2+\{2\times(-5y)+(-y)\times4\}x$
$+(-y)\times(-5y)$
$=8x^2-14xy+5y^2$
(15) $(-3x+2)(2x+3)$
$=\{(-3)\times2\}x^2+\{(-3)\times3+2\times2\}x+2\times3$
$=-6x^2-5x+6$
(16) $(-5x-4y)(-2x+y)$
$=\{(-5)\times(-2)\}x^2+\{(-5)\times y+(-4y)\times(-2)\}x$
$+(-4y)\times y$
$=10x^2+3xy-4y^2$

L - 57

(1) $4x^2-12x+9$
(2) $16-9x^2$
(3) $x^2+14xy+48y^2$
(4) $\frac{1}{6}x^2-x-12$
(5) $x^2+x+\frac{1}{4}$
(6) $-14x^2+31xy-15y^2$
(7) $36x^2-12xy+y^2$
(8) $\frac{1}{4}x^2-25y^2$
(9) $12x^2+28x-5$
(10) $x^2+6xy+9y^2$
(11) $4y^2-9x^2$
(12) $x^2-\frac{1}{4}x-\frac{1}{8}$
(13) $16x^2-25$
(14) $15x^2+22xy+8y^2$
(15) $\frac{1}{4}x^2-\frac{1}{9}y^2$
(16) $\frac{1}{9}x^2+\frac{4}{3}xy+4y^2$

〈풀이〉

(1) $(2x-3)^2=(2x)^2-2\times2x\times3+3^2$
$=4x^2-12x+9$

(2) $(4+3x)(4-3x)=4^2-(3x)^2=16-9x^2$

(3) $(x+8y)(x+6y)=x^2+(8y+6y)x+8y\times6y$
$=x^2+14xy+48y^2$

(4) $\left(\frac{1}{2}x+3\right)\left(\frac{1}{3}x-4\right)$
$=\left(\frac{1}{2}\times\frac{1}{3}\right)x^2+\left\{\frac{1}{2}\times(-4)+3\times\frac{1}{3}\right\}x+3\times(-4)$
$=\frac{1}{6}x^2-x-12$

(5) $\left(-x-\frac{1}{2}\right)^2=(-x)^2-2\times(-x)\times\frac{1}{2}+\left(\frac{1}{2}\right)^2$
$=x^2+x+\frac{1}{4}$

(6) $(-7x+5y)(2x-3y)$
$=\{(-7)\times2\}x^2+\{(-7)\times(-3y)+5y\times2\}x$
$+5y\times(-3y)$
$=-14x^2+31xy-15y^2$

(7) $(-6x+y)^2=(-6x)^2+2\times(-6x)\times y+y^2$
$=36x^2-12xy+y^2$

(8) $\left(\frac{1}{2}x-5y\right)\left(\frac{1}{2}x+5y\right)$
$=\left(\frac{1}{2}x\right)^2-(5y)^2$
$=\frac{1}{4}x^2-25y^2$

(9) $(2x+5)(6x-1)$
$=(2\times6)x^2+\{2\times(-1)+5\times6\}x+5\times(-1)$
$=12x^2+28x-5$

(10) $(-x-3y)^2=(-x)^2-2\times(-x)\times3y+(3y)^2$
$=x^2+6xy+9y^2$

(11) $(3x+2y)(2y-3x)=(2y+3x)(2y-3x)$
$=(2y)^2-(3x)^2$
$=4y^2-9x^2$

(12) $\left(x+\frac{1}{4}\right)\left(x-\frac{1}{2}\right)$
$=x^2+\left\{\frac{1}{4}+\left(-\frac{1}{2}\right)\right\}x+\frac{1}{4}\times\left(-\frac{1}{2}\right)$
$=x^2-\frac{1}{4}x-\frac{1}{8}$

(13) $(4x-5)(4x+5)=(4x)^2-5^2=16x^2-25$

(14) $(3x+2y)(5x+4y)$
$=(3\times5)x^2+(3\times4y+2y\times5)x+2y\times4y$
$=15x^2+22xy+8y^2$

(15) $\left(\frac{1}{2}x+\frac{1}{3}y\right)\left(\frac{1}{2}x-\frac{1}{3}y\right)=\left(\frac{1}{2}x\right)^2-\left(\frac{1}{3}y\right)^2$
$=\frac{1}{4}x^2-\frac{1}{9}y^2$

(16) $\left(\frac{1}{3}x+2y\right)^2=\left(\frac{1}{3}x\right)^2+2\times\frac{1}{3}x\times2y+(2y)^2$
$=\frac{1}{9}x^2+\frac{4}{3}xy+4y^2$

L - 58

(1) $x^2+8xy+16y^2$
(2) $15x^2-4xy-4y^2$
(3) $\frac{9}{16}y^2-x^2$
(4) $\frac{4}{9}x^2-8xy+36y^2$
(5) $x^2-7x+12$
(6) $4x^2-2x+\frac{1}{4}$
(7) $12x^2-31x+20$
(8) $49-4x^2$
(9) $4-25x^2$
(10) $x^2+\frac{1}{12}xy-\frac{1}{2}y^2$
(11) $81x^2-18xy+y^2$
(12) $20x^2+41x+20$
(13) $\frac{4}{9}y^2-x^2$
(14) $9y^2-4x^2$
(15) $12x^2-xy-\frac{1}{6}y^2$
(16) $9x^2+30xy+25y^2$

〈풀이〉

(1) $(x+4y)^2$
$=x^2+2\times x\times4y+(4y)^2$
$=x^2+8xy+16y^2$

(2) $(3x-2y)(5x+2y)$
$=(3\times5)x^2+\{3\times2y+(-2y)\times5\}x+(-2y)\times2y$
$=15x^2-4xy-4y^2$

(3) $\left(x+\frac{3}{4}y\right)\left(-x+\frac{3}{4}y\right)$

$=\left(\frac{3}{4}y+x\right)\left(\frac{3}{4}y-x\right)$

$=\left(\frac{3}{4}y\right)^2-x^2$

$=\frac{9}{16}y^2-x^2$

(4) $\left(\frac{2}{3}x-6y\right)^2$

$=\left(\frac{2}{3}x\right)^2-2\times\left(\frac{2}{3}x\right)\times 6y+(6y)^2$

$=\frac{4}{9}x^2-8xy+36y^2$

(5) $(x-3)(x-4)$

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

$=x^2-7x+12$

(6) $\left(-2x+\frac{1}{2}\right)^2$

$=(-2x)^2+2\times(-2x)\times\frac{1}{2}+\left(\frac{1}{2}\right)^2$

$=4x^2-2x+\frac{1}{4}$

(7) $(4x-5)(3x-4)$

$=(4\times 3)x^2+\{4\times(-4)+(-5)\times 3\}x+(-5)\times(-4)$

$=12x^2-31x+20$

(8) $(7+2x)(7-2x)=7^2-(2x)^2=49-4x^2$

(9) $(2-5x)(2+5x)=2^2-(5x)^2=4-25x^2$

(10) $\left(x-\frac{2}{3}y\right)\left(x+\frac{3}{4}y\right)$

$=x^2+\left\{\left(-\frac{2}{3}y\right)+\frac{3}{4}y\right\}x+\left(-\frac{2}{3}y\right)\times\left(\frac{3}{4}y\right)$

$=x^2+\frac{1}{12}xy-\frac{1}{2}y^2$

(11) $(9x-y)^2=(9x)^2-2\times 9x\times y+y^2$

$=81x^2-18xy+y^2$

(12) $(-4x-5)(-5x-4)$

$=\{(-4)\times(-5)\}x^2+\{(-4)\times(-4)+(-5)\times(-5)\}x$

$+(-5)\times(-4)$

$=20x^2+41x+20$

(13) $\left(x+\frac{2}{3}y\right)\left(\frac{2}{3}y-x\right)$

$=\left(\frac{2}{3}y+x\right)\left(\frac{2}{3}y-x\right)$

$=\left(\frac{2}{3}y\right)^2-x^2$

$=\frac{4}{9}y^2-x^2$

(14) $(-2x-3y)(2x-3y)=(-3y-2x)(-3y+2x)$

$=(-3y)^2-(2x)^2$

$=9y^2-4x^2$

(15) $\left(3x-\frac{1}{2}y\right)\left(4x+\frac{1}{3}y\right)$

$=(3\times 4)x^2+\left\{3\times\frac{1}{3}y+\left(-\frac{1}{2}y\right)\times 4\right\}x$

$+\left(-\frac{1}{2}y\right)\times\left(\frac{1}{3}y\right)$

$=12x^2-xy-\frac{1}{6}y^2$

(16) $(-3x-5y)^2=(-3x)^2-2\times(-3x)\times 5y+(5y)^2$

$=9x^2+30xy+25y^2$

L - 59

(1) $4xy$
(2) $6x+90$
(3) $2x^2+8x+36$
(4) $-4xy+21y^2$
(5) x^2-11y^2
(6) $2x^2-8x-15$
(7) $-10x^2+2x-4$
(8) $8x^2-6x+2$
(9) $2x^2+4xy-17y^2$
(10) $-x^2-xy-6y^2$

〈풀이〉

(1) $(x+y)^2-(x-y)^2$

$=x^2+2xy+y^2-(x^2-2xy+y^2)$

$=x^2+2xy+y^2-x^2+2xy-y^2$

$=4xy$

(2) $(x+3)^2-(x+9)(x-9)$

$=x^2+6x+9-(x^2-81)$

$=x^2+6x+9-x^2+81$

$=6x+90$

(3) $(x+4)(x+8)+(x-2)^2$

$=x^2+12x+32+x^2-4x+4$

$=2x^2+8x+36$

(4) $(x-6y)^2-(x-3y)(x-5y)$

$=x^2-12xy+36y^2-(x^2-8xy+15y^2)$

$=x^2-12xy+36y^2-x^2+8xy-15y^2$

$=-4xy+21y^2$

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

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

$=3x^2+8xy-3y^2-2x^2-8xy-8y^2$

$=x^2-11y^2$

(6) $(x+1)(x-7)+(x-4)(x+2)$

$=x^2-6x-7+x^2-2x-8$

$=2x^2-8x-15$

(7) $(2x+1)(x-3)-(3x-1)(4x-1)$
$=2x^2-5x-3-(12x^2-7x+1)$
$=2x^2-5x-3-12x^2+7x-1$
$=-10x^2+2x-4$
(8) $(3x-5)(3x+5)-(x-3)(x+9)$
$=9x^2-25-(x^2+6x-27)$
$=9x^2-25-x^2-6x+27$
$=8x^2-6x+2$
(9) $(x-2y)(5x+6y)-(3x-5y)(x-y)$
$=5x^2-4xy-12y^2-(3x^2-8xy+5y^2)$
$=5x^2-4xy-12y^2-3x^2+8xy-5y^2$
$=2x^2+4xy-17y^2$
(10) $(x+7y)(x-8y)-2(x-5y)(x+5y)$
$=x^2-xy-56y^2-2(x^2-25y^2)$
$=x^2-xy-56y^2-2x^2+50y^2$
$=-x^2-xy-6y^2$

L - 60

(1) $-60x$
(2) $-9x^2-19xy+12y^2$
(3) $7x^2+9x-2$
(4) $x^2+12xy+34y^2$
(5) $6x^2+9x-14$
(6) $-5x^2+13x+16$
(7) $3x^2+y^2-3xy$
(8) $-3x^2-20x+57$
(9) $-4x^2-5x-8$
(10) $5x^2+33xy+13y^2$

〈풀이〉

(1) $(3x-5)^2-(3x+5)^2$
$=9x^2-30x+25-(9x^2+30x+25)$
$=9x^2-30x+25-9x^2-30x-25$
$=-60x$
(2) $(x-3y)^2-(2x+3y)(5x-y)$
$=x^2-6xy+9y^2-(10x^2+13xy-3y^2)$
$=x^2-6xy+9y^2-10x^2-13xy+3y^2$
$=-9x^2-19xy+12y^2$
(3) $(x+1)^2+(2x+3)(3x-1)$
$=x^2+2x+1+6x^2+7x-3$
$=7x^2+9x-2$
(4) $2(x+3y)^2-(x-4y)(x+4y)$
$=2(x^2+6xy+9y^2)-(x^2-16y^2)$
$=2x^2+12xy+18y^2-x^2+16y^2$
$=x^2+12xy+34y^2$
(5) $(3x-2)^2-3(x-1)(x-6)$
$=9x^2-12x+4-3(x^2-7x+6)$
$=9x^2-12x+4-3x^2+21x-18$
$=6x^2+9x-14$
(6) $(x+6)(x+2)-(2x+1)(3x-4)$
$=x^2+8x+12-(6x^2-5x-4)$
$=x^2+8x+12-6x^2+5x+4$
$=-5x^2+13x+16$
(7) $(2x+3y)(2x-3y)-(x-2y)(x+5y)$
$=4x^2-9y^2-(x^2+3xy-10y^2)$
$=4x^2-9y^2-x^2-3xy+10y^2$
$=3x^2+y^2-3xy$
(8) $(x-7)(x-6)-(4x-5)(x+3)$
$=x^2-13x+42-(4x^2+7x-15)$
$=x^2-13x+42-4x^2-7x+15$
$=-3x^2-20x+57$
(9) $(x-5)(2x+4)-(3x+4)(2x-3)$
$=2x^2-6x-20-(6x^2-x-12)$
$=2x^2-6x-20-6x^2+x+12$
$=-4x^2-5x-8$
(10) $(4x+3y)(2x+5y)-(3x-y)(x-2y)$
$=8x^2+26xy+15y^2-(3x^2-7xy+2y^2)$
$=8x^2+26xy+15y^2-3x^2+7xy-2y^2$
$=5x^2+33xy+13y^2$

• 성취도 테스트

L1 - ①

(1) a^4b^3
(2) x^{25}
(3) a^9b^3
(4) y^2
(5) $\frac{1}{b^8}$
(6) 1

〈풀이〉

(1) $b\times a^4\times b^2=a^4\times b\times b^2$
$=a^4\times b^{1+2}$
$=a^4\times b^3$
$=a^4b^3$
(2) $(x^3)^7\times x^4=x^{3\times7}\times x^4$
$=x^{21}\times x^4$
$=x^{21+4}$
$=x^{25}$
(3) $(a^4)^2\times ab^3=a^{4\times2}\times ab^3$
$=a^8\times ab^3$
$=a^8\times a\times b^3$
$=a^{8+1}\times b^3$
$=a^9b^3$
(4) $y^5\div(y^7\div y^4)=y^5\div y^{7-4}$
$=y^5\div y^3$
$=y^{5-3}$
$=y^2$

(5) $(b^2)^5 \div (b^6)^3 = b^{2\times5} \div b^{6\times3}$
$= b^{10} \div b^{18}$
$= \frac{1}{b^{18-10}}$
$= \frac{1}{b^8}$

(6) $(x^2)^3 \div x^2 \div x^4 = x^{2\times3} \div x^2 \div x^4$
$= x^{6-2} \div x^4$
$= x^4 \div x^4$
$= 1$

L1 - ②

(7) $a^{10}b^8$ (8) $\frac{9x^4}{y^4z^6}$ (9) $5a^5b^4$

(10) $20x^5y$ (11) $\frac{2b}{a^2}$

〈풀이〉

(7) $(a^3b^2)^3 \times ab^2 = a^9b^6 \times ab^2$
$= a^9 \times b^6 \times a \times b^2$
$= a^9 \times a \times b^6 \times b^2$
$= a^{9+1} \times b^{6+2}$
$= a^{10}b^8$

(8) $\left(-\frac{3x^2}{y^2z^3}\right)^2 = \frac{(-3x^2)^2}{(y^2z^3)^2}$
$= \frac{(-3)^2(x^2)^2}{(y^2)^2(z^3)^2}$
$= \frac{9x^4}{y^4z^6}$

(9) $(-5ab) \times (-a^4b^3)$
$= (-5) \times a \times b \times (-1) \times a^4 \times b^3$
$= (-5) \times (-1) \times a \times b \times a^4 \times b^3$
$= 5a^5b^4$

(10) $(-2x)^2 \times 5x^3y$
$= 4x^2 \times 5x^3y$
$= 4 \times x^2 \times 5 \times x^3 \times y$
$= 4 \times 5 \times x^2 \times x^3 \times y$
$= 20x^5y$

(11) $8ab^2 \div 4a^3b = \frac{8ab^2}{4a^3b}$
$= \frac{8 \times a \times b^2}{4 \times a^3 \times b}$
$= \frac{2b}{a^2}$

L1 - ③

(12) $-2x^8y$ (13) $-24a^3b^4$ (14) $-\frac{2}{x^4y}$

(15) $144a^7b^{12}$ (16) $\frac{8x}{9y^2}$

〈풀이〉

(12) $(-2x^3y^2)^3 \div 4xy^5 = (-8x^9y^6) \div 4xy^5$
$= \frac{-8x^9y^6}{4xy^5}$
$= \frac{(-8) \times x^9 \times y^6}{4 \times x \times y^5}$
$= -2x^8y$

(13) $(-2a^2) \times 3b^3 \times 4ab = (-2) \times 3 \times 4 \times a^2 \times b^3 \times ab$
$= -24a^3b^4$

(14) $x \times (-2xy) \div (-x^3y)^2 = x \times (-2xy) \div x^6y^2$
$= x \times (-2xy) \times \frac{1}{x^6y^2}$
$= (-2) \times x \times xy \times \frac{1}{x^6y^2}$
$= -\frac{2}{x^4y}$

(15) $(2a^2b^3)^4 \div a^3b^2 \times (3ab)^2$
$= 16a^8b^{12} \div a^3b^2 \times 9a^2b^2$
$= 16a^8b^{12} \times \frac{1}{a^3b^2} \times 9a^2b^2$
$= 16 \times 9 \times a^8b^{12} \times \frac{1}{a^3b^2} \times a^2b^2$
$= 144a^7b^{12}$

(16) $(2x^2y)^3 \div (-3xy^2)^2 \div x^3y$
$= 8x^6y^3 \div 9x^2y^4 \div x^3y$
$= 8x^6y^3 \times \frac{1}{9x^2y^4} \times \frac{1}{x^3y}$
$= 8 \times \frac{1}{9} \times x^6y^3 \times \frac{1}{x^2y^4} \times \frac{1}{x^3y}$
$= \frac{8x}{9y^2}$

L1 - ④

(17) $7a^2+a+1$ (18) x^2+7x-2

(19) $\frac{5}{12}a^2+\frac{5}{12}a$ (20) $\frac{7}{12}x^2+\frac{1}{6}x+\frac{17}{12}$

(21) $2a-4b$

〈풀이〉

(17) $(5a^2-a+3)+2(a^2+a-1)$
$=5a^2-a+3+2a^2+2a-2$
$=5a^2+2a^2-a+2a+3-2$
$=7a^2+a+1$

(18) $2(3x^2+x-6)-5(x^2-x-2)$
$=6x^2+2x-12-5x^2+5x+10$
$=6x^2-5x^2+2x+5x-12+10$
$=x^2+7x-2$

(19) $\frac{1}{3}(2a^2-a)-\frac{1}{4}(a^2-3a)$
$=\frac{2}{3}a^2-\frac{1}{3}a-\frac{1}{4}a^2+\frac{3}{4}a$
$=\frac{2}{3}a^2-\frac{1}{4}a^2-\frac{1}{3}a+\frac{3}{4}a$
$=\frac{5}{12}a^2+\frac{5}{12}a$

(20) $\frac{1}{4}(x^2+2x+3)+\frac{1}{3}(x^2-x+2)$
$=\frac{1}{4}x^2+\frac{1}{2}x+\frac{3}{4}+\frac{1}{3}x^2-\frac{1}{3}x+\frac{2}{3}$
$=\frac{1}{4}x^2+\frac{1}{3}x^2+\frac{1}{2}x-\frac{1}{3}x+\frac{3}{4}+\frac{2}{3}$
$=\frac{7}{12}x^2+\frac{1}{6}x+\frac{17}{12}$

(21) $3a-\{2a-b-(a-5b)\}$
$=3a-(2a-b-a+5b)$
$=3a-(a+4b)$
$=3a-a-4b$
$=2a-4b$

L1 - ⑤

(22) $-4x^2+3x$ (23) $13a-5b$
(24) $3x^2-2x$ (25) $2a^2-\frac{3}{2}ab+3a$
(26) $10x^2-6xy+2x$

〈풀이〉

(22) $x^2+2x-\{3x^2-(x-2x^2)\}$
$=x^2+2x-(3x^2-x+2x^2)$
$=x^2+2x-(5x^2-x)$
$=x^2+2x-5x^2+x$
$=-4x^2+3x$

(23) $9a-[\{4b-(2a-b)\}-2a]$
$=9a-\{(4b-2a+b)-2a\}$
$=9a-\{(5b-2a)-2a\}$
$=9a-(5b-2a-2a)$
$=9a-(5b-4a)$
$=9a-5b+4a$
$=13a-5b$

(24) $4x^2+2x-[3x^2+\{3x-(2x^2-x)\}]$
$=4x^2+2x-\{3x^2+(3x-2x^2+x)\}$
$=4x^2+2x-\{3x^2+(4x-2x^2)\}$
$=4x^2+2x-(3x^2+4x-2x^2)$
$=4x^2+2x-(x^2+4x)$
$=4x^2+2x-x^2-4x$
$=3x^2-2x$

(25) $\frac{1}{2}a(4a-3b+6)$
$=\frac{1}{2}a\times4a+\frac{1}{2}a\times(-3b)+\frac{1}{2}a\times6$
$=2a^2-\frac{3}{2}ab+3a$

(26) $(-5x+3y-1)\times(-2x)$
$=-5x\times(-2x)+3y\times(-2x)-1\times(-2x)$
$=10x^2-6xy+2x$

L1 - ⑥

(27) $-a^2+8ab$ (28) $-4x+2y$
(29) $\frac{25}{4}a-\frac{5}{8}b+5$ (30) $x-y$
(31) $-5a^2+6ab+8b^2$

〈풀이〉

(27) $2a(a+b)-3a(a-2b)=2a^2+2ab-3a^2+6ab$
$=-a^2+8ab$

(28) $(12x^2-6xy)\div(-3x)=\frac{12x^2-6xy}{-3x}$
$=\frac{12x^2}{-3x}-\frac{6xy}{-3x}$
$=-4x+2y$

(29) $\left(5a^2-\frac{1}{2}ab+4a\right)\div\frac{4}{5}a$
$=\left(5a^2-\frac{1}{2}ab+4a\right)\times\frac{5}{4a}$
$=5a^2\times\frac{5}{4a}-\frac{1}{2}ab\times\frac{5}{4a}+4a\times\frac{5}{4a}$

$=\frac{25}{4}a-\frac{5}{8}b+5$

(30) $(5x^2-15xy)\div(-5x)+(xy-2y^2)\div\frac{1}{2}y$

$=\frac{5x^2-15xy}{-5x}+(xy-2y^2)\times\frac{2}{y}$

$=-x+3y+2x-4y$

$=x-y$

(31) $(-5a-4b)(a-2b)$

$=-5a\times a-5a\times(-2b)-4b\times a-4b\times(-2b)$

L1 - ⑦

(32) $3x^2-5xy-2y^2+2x-4y$

(33) $a^2+\frac{2}{3}a+\frac{1}{9}$ (34) $4x^2-12xy+9y^2$

(35) b^2-4a^2 (36) $x^2+\frac{17}{12}x+\frac{1}{2}$

〈풀이〉

(32) $(3x+y+2)(x-2y)$

$=3x^2-6xy+xy-2y^2+2x-4y$

$=3x^2-5xy-2y^2+2x-4y$

(33) $\left(a+\frac{1}{3}\right)^2=a^2+2\times a\times\frac{1}{3}+\left(\frac{1}{3}\right)^2$

$=a^2+\frac{2}{3}a+\frac{1}{9}$

(34) $(2x-3y)^2=(2x)^2-2\times2x\times3y+(3y)^2$

$=4x^2-12xy+9y^2$

(35) $(2a+b)(b-2a)=(b+2a)(b-2a)$

$=b^2-(2a)^2$

$=b^2-4a^2$

(36) $\left(x+\frac{2}{3}\right)\left(x+\frac{3}{4}\right)=x^2+\left(\frac{2}{3}+\frac{3}{4}\right)x+\frac{2}{3}\times\frac{3}{4}$

$=x^2+\frac{17}{12}x+\frac{1}{2}$

L1 - ⑧

(37) $-6x^2-xy+5y^2$ (38) $3x^2-\frac{3}{4}x-\frac{3}{8}$

(39) $3x^2-10xy-16y^2$ (40) $-3x^2+15x+14$

〈풀이〉

(37) $(6x-5y)(-x-y)$

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

$+(-5y)\times(-y)$

$=-6x^2-xy+5y^2$

(38) $\left(3x-\frac{3}{2}\right)\left(x+\frac{1}{4}\right)$

$=(3\times1)x^2+\left\{3\times\frac{1}{4}+\left(-\frac{3}{2}\right)\times1\right\}x+\left(-\frac{3}{2}\right)\times\frac{1}{4}$

$=3x^2-\frac{3}{4}x-\frac{3}{8}$

(39) $(x-2y)^2+(x-5y)(2x+4y)$

$=x^2-4xy+4y^2+2x^2-6xy-20y^2$

$=3x^2-10xy-16y^2$

(40) $(x+2)(x+6)-(4x+1)(x-2)$

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

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

$=-3x^2+15x+14$