【解答】数学（教養）

問1

(1)	$64+18-36=46$	(2)	$38-(24-7)$ $=38-24+7$ $=21$	(3)	0.46×0.59 $=0.2714$
(4)	$7.56\div0.12$ $=756\div12$ $=63$	(5)	$\frac{3}{4}+\frac{1}{6}-\frac{2}{3}$ $=\frac{9}{12}+\frac{2}{12}-\frac{8}{12}=\frac{3}{12}=\frac{1}{4}$	(6)	$(-9)\times3=-27$
(7)	$(-3)\times(-6)\times(-2)$ $=-(3\times6\times2)$ $=-36$	(8)	$60\div(-4)$ $=-(60\div4)$ $=-15$	(9)	$-9\div\frac{3}{5}$ $=-9\times\frac{5}{3}=-15$
(10)	$\left(-\frac{15}{7}\right)\div\left(-\frac{3}{14}\right)$ $=\frac{15^{5}}{7_{1}}\times\frac{14^{2}}{3_{1}}=5\times2=10$	(11)	$\frac{4}{15}\times\frac{9}{2}\div\frac{3}{5}=\frac{4^{2}}{15_{1}}\times\frac{9^{1}}{2_{1}}\times\frac{5^{1}}{3_{1}}$ $=2\times1\times1=2$	(12)	$5+64\div8-2\times3$ $=5+(64\div8)-(2\times3)$ $=5+8-6$ $=7$
(13)	$-6+(-3)\times\{2-(-4)\}$ $=-6+(-3)\times6$ $=-6-18$ $=-24$	(14)	$(-3)^2\div9+6\times\left(-2^3\right)$ $=9\div9+6\times(-8)$ $=1-48=-47$	(15)	$(-\frac{9}{10})\div(-\frac{3}{7})\div(-\frac{7}{5})$ $=-(\frac{9^{3}}{10_{2}}\times\frac{7^{1}}{3_{1}}\times\frac{5^{1}}{7_{1}})=-\frac{3}{2}$

問2

(1)	$5x-9y-7x+4y$ $=(5x-7x)+(-9y+4y)$ $=-2x-5y$	(2)	$(3x-4y)+(7x-y)$ $=3x-4y+7x-y$ $=(3x+7x)+(-4y-y)$ $=10x-5y$	(3)	$(x+6y)-(-2x+3y)$ $=x+6y+2x-3y$ $=(x+2x)+(6y-3y)=3x+3y$
(4)	$x^2-5x-x-3x^2$ $=(x^2-3x^2)+(-5x-x)$ $=-2x^2-6x$	(5)	$x+\frac{1}{2}y-2x+\frac{2}{3}y$ $=x-2x+\frac{1}{2}y+\frac{2}{3}y=-x+\frac{7}{6}y$	(6)	$a^{13}\times a^{8}$ $=a^{13+8}$ $=a^{21}$
(7)	$(x^4)^4=x^{4\times4}=x^{16}$	(8)	$(3x^2y^4)^3=3^3x^{2\times3}y^{4\times3}$ $=27x^6y^{12}$	(9)	$3x\times(-8xy)=-3\times8\times x\times x\times y$ $=-24x^2y$
(10)	$\frac{4}{5}ab\times\left(-\frac{5}{2}ab\right)$ $=-\frac{{}^{2}\cancel{4}ab\times\cancel{5}^{1}ab}{{}_{1}\cancel{5}\times\cancel{2}_{1}}=-2a^2b^2$	(11)	$12x^2y\div4x^2$ $=\frac{{}^{3}\cancel{12}x^{2}y}{\cancel{4}x^{2}}=3y$	(12)	$5x\div\left(-\frac{5}{6}x^2\right)$ $=5x\times\left(-\frac{6}{5x^2}\right)=-\frac{6}{x}$

問3

(1)	$4a(a-5)$ $=4a\times a+4a\times(-5)$ $=4a^2-20a$	(2)	$5x(x+2y+3)$ $=5x\times x+5x\times2y+5x\times3$ $=5x^2+10xy+15x$		
(3)	$(a+2b)(3a+5)$ $=a\times3a+a\times5+2b\times3a+2b\times5$ $=3a^2+6ab+5a+10b$	(4)	$(3x-2)^2$ $=(3x)^2+2\times3x\times(-2)+(-2)^2$ $=9x^2-12x+4$		
(5)	$(x+12)(x-12)$ $=x^2-12^2=x^2-144$	(6)	$(2x+3)(x-3)$ $=2x\times x+2x\times(-3)+3\times x+3\times(-3)$ $=2x^2-6x+3x-9=2x^2-3x-9$		
(7)	$(x+5)(x-4)$ $=x^2+(5-4)x+5\times(-4)$ $=x^2+x-20$	(8)	$(x+1)(x-1)(3-4x)$ $=(x^2-1)(3-4x)$ $=x^2\times3-x^2\times4x-1\times3-1\times(-4x)$ $=-4x^3+3x^2+4x-3$		

問4	(1)	$5x^2-10x$ $=5x(x-2)$	(2)	$3abc+6bc+15bc^2$ $=3bc(a+2+5c)$
	(3)	$x^2+12x+36$ $=x^2+(2\times6)x+6^2$ $=(x+6)^2$	(4)	$2x^2-8x+8$ $=2(x^2-4x+4)$ $=2(x^2-(2\times2)x+2^2)$ $=2(x-2)^2$
	(5)	$36-a^2$ $=6^2-a^2$ $=(6-a)(6+a)$	(6)	$x^2+11x+18$ $=x^2+(2+9)x+(2\times9)$ $=(x+2)(x+9)$
	(7)	$x^2+2x-24$ $=x^2+(6-4)x+\{6\times(-4)\}$ $=(x+6)(x-4)$	(8)	$mn+m-n-1$ $=m(n+1)-(n+1)$ $=(m-1)(n+1)$

Challenge 問題

(1)	①	$(x-y+1)(x-y-1)$ $=(M+1)(M-1)$ ← $x-y=M$とおく $=M^2-1^2$ $=(x-y)^2-1$ $=x^2-2xy+y^2-1$
	②	$(x-1)^3$ $=(x-1)(x-1)(x-1)$ $=(x^2-2x+1)(x-1)$ $=x^3-x^2-2x^2+2x+x-1$ $=x^3-3x^2+3x-1$
(2)	①	$10x^2-x-3$ $=(2\times5)x^2+(2\times(-3)+1\times5)x+1\times(-3)$ $=(2x+1)(5x-3)$ $acx^2+(ad+bc)x+bd=(ax+b)(cx+d)$
	②	$a+2b+3ab+6b^2$ $=a(1+3b)+2b(1+3b)$ $=(a+2b)(1+3b)$
	③	$(x-1)^2+3(x-1)-4$ $=M^2+3M-4$ ← $x-1=M$ とおく $=(M+4)(M-1)$ $=(x-1+4)(x-1-1)$ $=(x+3)(x-2)$