

練習問題の解答

① (1) $(-x^4)^3 \times (-xy)^2$
 $= (-1)^3 \cdot (x^4)^3 \cdot (-1)^2 \cdot x^2 \cdot y^2$
 $= -1 \cdot x^{4 \times 3} \cdot 1 \cdot x^2 \cdot y^2$
 $= -1 \cdot x^{12} \cdot x^2 \cdot y^2$
 $= -x^{12+2} \cdot y^2$
 $= -x^{14} y^2$ 答

(2) $(4a^3bc^2)^2 \times \left(-\frac{3}{8}a^2b^3c\right)^3$
 $= 4^2 \cdot (a^3)^2 \cdot b^2 \cdot (c^2)^2 \cdot \left(-\frac{3}{8}\right)^3 \cdot (a^2)^3 \cdot (b^3)^3 \cdot c^3$
 $= 16 \cdot a^{3 \times 2} \cdot b^2 \cdot c^{2 \times 2} \cdot \left(-\frac{27}{512}\right) \cdot a^{2 \times 3} \cdot b^{3 \times 3} \cdot c^3$
 $= 16 \cdot a^6 \cdot b^2 \cdot c^4 \cdot \left(-\frac{27}{512}\right) \cdot a^6 \cdot b^9 \cdot c^3$
 $= 16 \cdot \left(-\frac{27}{512}\right) \cdot a^{6+6} \cdot b^{2+9} \cdot c^{4+3}$
 $= -\frac{27}{32} a^{12} b^{11} c^7$ 答

(3) $(a^4b^3c)^2 \times (a^3bc^2)^4 \div (ab^2c^4)^3$
 $= \frac{(a^4)^2 \cdot (b^3)^2 \cdot c^2 \cdot (a^3)^4 \cdot b^4 \cdot (c^2)^4}{a^3 \cdot (b^2)^3 \cdot (c^4)^3}$
 $= \frac{a^{4 \times 2} \cdot b^{3 \times 2} \cdot c^2 \cdot a^{3 \times 4} \cdot b^4 \cdot c^{2 \times 4}}{a^3 \cdot b^{2 \times 3} \cdot c^{4 \times 3}}$
 $= \frac{a^8 \cdot b^6 \cdot c^2 \cdot a^{12} \cdot b^4 \cdot c^8}{a^3 \cdot b^6 \cdot c^{12}}$
 $= \frac{a^{8+12} \cdot b^{6+4} \cdot c^{2+8}}{a^3 \cdot b^6 \cdot c^{12}}$
 $= \frac{a^{20} b^{10} c^{10}}{a^3 b^6 c^{12}} = \frac{a^{17} b^4}{c^2}$ 答

② (1) $(a+b)^3 + (a-b)^3$
 $= a^3 + 3a^2b + 3ab^2 + b^3$
 $\quad + a^3 - 3a^2b + 3ab^2 - b^3$
 $= 2a^3 + 6ab^2$ 答

(2) $(2\sqrt{3} - \sqrt{2})^2 + (2\sqrt{2} + \sqrt{3})^2$
 $= (2\sqrt{3})^2 - 2 \cdot 2\sqrt{3} \cdot \sqrt{2} + (\sqrt{2})^2$
 $\quad + (2\sqrt{2})^2 + 2 \cdot 2\sqrt{2} \cdot \sqrt{3} + (\sqrt{3})^2$
 $= 12 - 4\sqrt{6} + 2 + 8 + 4\sqrt{6} + 3$
 $= 25$ 答

(3) $(1 + \sqrt{2} + \sqrt{3})(1 + \sqrt{2} - \sqrt{3})$
 $= \{(1 + \sqrt{2}) + \sqrt{3}\} \{(1 + \sqrt{2}) - \sqrt{3}\}$
 $= (1 + \sqrt{2})^2 - (\sqrt{3})^2$
 $= 1^2 + 2 \cdot 1 \cdot \sqrt{2} + (\sqrt{2})^2 - 3$
 $= 1 + 2\sqrt{2} + 2 - 3 = 2\sqrt{2}$ 答

(4) $(x+y+z)^2 - 2(xy+yz+zx)$
 $= x^2 + y^2 + z^2 + 2xy + 2yz + 2zx - 2xy - 2yz - 2zx$
 $= x^2 + y^2 + z^2 = (2\sqrt{3})^2 + (-\sqrt{5})^2 + 3^2$
 $= 12 + 5 + 9 = 26$ 答

③ (1) $4x^2 - 17x + 4$
 $= (x-4)(4x-1)$ 答

1	×	-4	—	-16
4	×	-1	—	-1
4		4		-17

(2) $8x^2 + 26xy + 15y^2$
 $= (2x+5y)(4x+3y)$ 答

2	×	5y	—	20y
4	×	3y	—	6y
8		15y ²		26y

(3) $15x^2 - 32xy - 7y^2$
 $= (5x+y)(3x-7y)$ 答

5	×	y	—	3y
3	×	-7y	—	-35y
15		-7y ²		-32y

(4) $4x^4 + 3x^2 - 1$ について
 $x^2 = A$ とおくと

$$4A^2 + 3A - 1$$

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

となるので、

$$4x^4 + 3x^2 - 1$$

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

$$= \{(2x)^2 - 1^2\}(x^2 + 1)$$

$$= (2x + 1)(2x - 1)(x^2 + 1)$$
 答

4	×	-1	—	-1
1	×	1	—	4
4		-1		3

④ (1) $27x^3 - y^3$
 $= (3x)^3 - y^3$
 $= (3x - y)\{(3x)^2 + 3x \cdot y + y^2\}$
 $= (3x - y)(9x^2 + 3xy + y^2)$ 答

(2) $8x^3 - 125$
 $= (2x)^3 - 5^3$
 $= (2x - 5)\{(2x)^2 + 2x \cdot 5 + 5^2\}$
 $= (2x - 5)(4x^2 + 10x + 25)$ 答

(3) $x^9 + y^9$
 $= (x^3)^3 + (y^3)^3$
 $= (x^3 + y^3)\{(x^3)^2 - x^3 \cdot y^3 + (y^3)^2\}$
 $= (x^3 + y^3)(x^6 - x^3y^3 + y^6)$
 $= (x + y)(x^2 - xy + y^2)(x^6 - x^3y^3 + y^6)$ 答