

□1 次の式を因数分解せよ。

(1) $xy^2 - 2xy$

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

(3) $9x^2 + 12xy + 4y^2$

(4) $64x^2y^2 - 25$

(5) $x^2 - 5x + 6$

(6) $x^2 - 6x - 16$

(7) $2x^2 - 3x - 5$

(8) $6x^2 + x - 15$

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

(10) $(2a - b)^2 + 7(2a - b)$

□2 次の値を求めよ。

(1) ${}_6C_3$

(2) ${}_8C_4$

(3) ${}_{10}C_0$

(4) ${}_{10}C_9$

(5) ${}_{100}C_{98}$

(6) ${}_7C_3$

(7) ${}_8C_3$

(8) ${}_5C_1$

(9) ${}_6C_6$

$$\boxed{1} \quad (1) \quad xy^2 - 2xy = xy \times y - 2 \times xy = \mathbf{xy(y-2)}$$

$$(2) \quad 4x^2 - 4x + 1 = (2x)^2 - 2 \times 2x \times 1 + 1^2 = \mathbf{(2x-1)^2}$$

$$(3) \quad 9x^2 + 12xy + 4y^2 = (3x)^2 + 2 \times 3x \times 2y + (2y)^2 = \mathbf{(3x+2y)^2}$$

$$(4) \quad 64x^2y^2 - 25 = (8xy)^2 - 5^2 = \mathbf{(8xy+5)(8xy-5)}$$

(5) 和が -5 ，積が 6 となるのは -2 と 3 より、

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

(6) 和が -6 ，積が -16 となるのは -8 と 2 であるから

$$x^2 - 6x - 16 = \mathbf{(x-8)(x+2)}$$

(7) 積が 2 ，積が -5 となることから

$$2x^2 - 3x - 5 = \mathbf{(x+1)(2x-5)}$$

$$\begin{array}{r} 2 \quad -5 \\ \hline 1 \quad +1 \longrightarrow +2 \\ 2 \quad -5 \longrightarrow -5 \\ \hline -3 \end{array}$$

(8) 積が 6 ，積が -15 となることから

$$6x^2 + x - 15 = \mathbf{(2x-3)(3x+5)}$$

$$\begin{array}{r} 6 \quad -15 \\ \hline 2 \quad -3 \longrightarrow -9 \\ 3 \quad +5 \longrightarrow +10 \\ \hline +1 \end{array}$$

(9) $x+2y=A$ とおくと

$$\begin{aligned} & (x+2y)^2 - 3(x+2y) + 2 \\ &= A^2 - 3A + 2 \\ &= (A-1)(A-2) \\ &= \mathbf{(x+2y-1)(x+2y-2)} \end{aligned}$$

(10) $2a-b=A$ とおくと

$$\begin{aligned} & (2a-b)^2 + 7(2a-b) \\ &= A^2 + 7A = A(A+7) \\ &= \mathbf{(2a-b)(2a-b+7)} \end{aligned}$$

$\boxed{2}$

$$(1) \quad {}_6C_3 = \frac{6 \times 5 \times 4}{3 \times 2 \times 1} = \mathbf{20}$$

$$(2) \quad {}_8C_4 = \frac{8 \times 7 \times 6 \times 5}{4 \times 3 \times 2 \times 1} = \mathbf{70}$$

$$(3) \quad {}_{10}C_0 = \mathbf{1}$$

$$(4) \quad {}_{10}C_9 = {}_{10}C_{10-9} = {}_{10}C_1 = \frac{10}{1} = \mathbf{10}$$

$$(5) \quad {}_{100}C_{98} = {}_{100}C_{100-98} = {}_{100}C_2 = \frac{100 \times 99}{2 \times 1} = \mathbf{4950}$$

$$(6) \quad {}_7C_3 = \frac{7 \times 6 \times 5}{3 \times 2 \times 1} = \mathbf{35}$$

$$(7) \quad {}_8C_3 = \frac{8 \times 7 \times 6}{3 \times 2 \times 1} = \mathbf{56}$$

$$(8) \quad {}_5C_1 = \frac{5}{1} = \mathbf{5}$$

$$(9) \quad {}_6C_6 = {}_6C_{6-6} = {}_6C_0 = \mathbf{1} \quad (\text{別解 } {}_6C_6 = \frac{6 \times 5 \times 4 \times 3 \times 2 \times 1}{6 \times 5 \times 4 \times 3 \times 2 \times 1} = 1)$$