

因数分解(難関)④

次の式を因数分解しなさい。

(1) $x(x - 9) + 20$

(2) $(a + 1)^2 - 2b(a + 1) + b^2$

(3) $4x^2y^2 - 4x^2 - y^2 + 1$

(4) $(x^2 + 5x)^2 + 2(x^2 + 5x) - 24$

(5) $x^2 + y^2 - 2xy - 3x + 3y$

解答

(1) $x(x - 9) + 20$

$$= x^2 - 9x + 20$$

$$\underline{\underline{= (x - 4)(x - 5)}}$$

(2) $(a + 1)^2 - 2b(a + 1) + b^2$

$$a + 1 = M \text{ とすると}$$

$$= M^2 - 2bM + b^2$$

$$= (M - b)^2$$

$$\underline{\underline{= (a - b + 1)^2}}$$

(3) $4x^2y^2 - 4x^2 - y^2 + 1$

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

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

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

(4) $(x^2 + 5x)^2 + 2(x^2 + 5x) - 24$

$$x^2 + 5x = M \text{ とすると}$$

$$= M^2 + 2M - 24$$

$$= (M + 6)(M - 4)$$

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

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

(5) $x^2 + y^2 - 2xy - 3x + 3y$

$$= (x - y)^2 - 3(x - y)$$

$$= (x - y)\{(x - y) - 3\}$$

$$\underline{\underline{= (x - y)(x - y - 3)}}$$

