

92 【平方完成】以下の二次関数の軸と頂点を求めよ。(aは0ではない定数とする.)

(1) $y = x^2 + 2x + 3$

$$= (x+1)^2 + 2.$$

~~軸~~ ⑥ $x = -1$

⑦ $(-1, 2)$

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

$$= 2(x-1)^2 - 3$$

⑥ $x = 1.$

⑦ $(1, -3)$

(3) $y = (x-2)(x+1)$

$$= x^2 - xc - 2$$

$$= (x - \frac{1}{2})^2 - \frac{1}{4} - 2$$

$$= (x - \frac{1}{2})^2 - \frac{9}{4}$$

⑥ $x = \frac{1}{2}$

⑦ $(\frac{1}{2}, -\frac{9}{4})$

(4) $y = -x^2 + 4x + 8$

$$= -(x-2)^2 + 12$$

⑥ $x = 2$

⑦ $(2, 12)$

(5) $y = x^2 + 5x + 1$

$$= (x + \frac{5}{2})^2 - \frac{25}{4} + 1$$

$$= (x + \frac{5}{2})^2 - \frac{21}{4}$$

⑥ $x = -\frac{5}{2}$

⑦ $(-\frac{5}{2}, -\frac{21}{4})$

$$(6) y = 2x^2 + 6x + 2$$

$$= 2(x^2 + 3x) + 2$$

$$= 2\left(x + \frac{3}{2}\right)^2 - \frac{9}{2} + 2$$

$$= 2\left(x + \frac{3}{2}\right)^2 - \frac{5}{2}$$

$$\textcircled{V} \quad x = -\frac{3}{2}$$

$$\textcircled{VI} \quad \left(-\frac{3}{2}, -\frac{5}{2}\right)$$

$$(7) y = x^2 + 2ax + 4$$

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

$$\textcircled{VII} \quad x = -a$$

$$\textcircled{VIII} \quad (-a, 4-a^2)$$

$$(8) y = 2x^2 + 4ax + a$$

$$= 2(x^2 + 2ax) + a$$

$$= 2(x+a)^2 - 2a^2 + a$$

$$\textcircled{IX} \quad x = -a$$

$$\textcircled{X} \quad (-a, a-2a^2)$$

$$(9) y = -2x^2 + 3ax + a^2$$

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

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

$$= -2\left(x - \frac{3}{4}a\right)^2 + \frac{11}{2}a^2$$

$$\textcircled{XI} \quad x = \frac{3}{4}a$$

$$\textcircled{XII} \quad \left(\frac{3}{4}a, \frac{11}{2}a^2\right)$$

$$(10) y = ax^2 + 2ax + a^2 + 3a$$

$$= a(x^2 + 2x) + a^2 + 3a$$

$$= a(x+1)^2 - a + a^2 + 3a$$

$$= a(x+1)^2 + a^2 + 2a$$

$$\textcircled{XIII} \quad x = -1$$

$$\textcircled{XIV} \quad (-1, a^2 + 2a)$$