

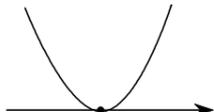
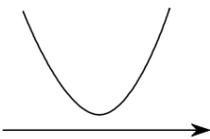
複素数と方程式 (公式)

複素数の相等

$$\bigcirc + \Delta i = \bullet + \blacktriangle i \iff \bigcirc = \bullet, \Delta = \blacktriangle$$

$$\bigcirc + \Delta i = 0 \iff \bigcirc = 0, \Delta = 0$$

解の種類

判別式	解の種類	
$D > 0$	\iff 実数解 2 個	
$D = 0$	\iff 実数解 1 個	
$D < 0$	\iff 虚数解 2 個	

解と係数の関係

$ax^2 + bx + c = 0$ 2 解 \bigcirc, Δ のとき

$$\bigcirc + \Delta = -\frac{b}{a}$$

$$\bigcirc \Delta = \frac{c}{a}$$

$$ax^2 + bx + c = a(x - \bigcirc)(x - \Delta)$$

$$x^2 - (\bigcirc + \Delta)x + \bigcirc \Delta = 0$$

$$x^2 - (\text{和})x + (\text{積}) = 0$$

式変形

$$\bigcirc^2 + \Delta^2 = (\bigcirc + \Delta)^2 - 2\bigcirc\Delta$$

$$\bigcirc^3 + \Delta^3 = (\bigcirc + \Delta)^3 - 3\bigcirc\Delta(\bigcirc + \Delta)$$

$$(\bigcirc - \Delta)^2 = (\bigcirc + \Delta)^2 - 4\bigcirc\Delta$$

剰余の定理

$$P(x) \text{ を 1 次式 } x - \bullet \text{ で割った余り} \iff P(\bullet)$$

高次方程式の解き方

① 因数分解

例 $x^3 = 8$
 $x^3 - 8 = 0$
 $(x - 2)(x^2 + x + 4) = 0$

$$\begin{aligned} x - 2 = 0 & & x^2 + x + 4 = 0 \\ x = 2 & & x = -1 \pm \sqrt{3}i \end{aligned}$$

よって
 $x = 2, -1 \pm \sqrt{3}i$

② 置き換え

例 $x^4 - x^2 - 2 = 0$
 $x^2 = X$ とおくと
 $X^2 - X - 2 = 0$
 $(X - 2)(X + 1) = 0$

$$\begin{aligned} X = 2, -1 & \\ x^2 = 2 & & x^2 = -1 \\ x = \pm\sqrt{2} & & x = \pm i \end{aligned}$$

よって
 $x = \pm\sqrt{2}, \pm 1$

③ 因数定理

例 $x^3 - 4x^2 + 8 = 0$

2	1	-4	0	8
	(×2)	2	-4	-8
	1	-2	-4	0
			商	余り

$$(x - 2)(x^2 - 2x - 4) = 0$$

$$\begin{aligned} x - 2 = 0 & & x^2 - 2x - 4 = 0 \\ x = 2 & & x = 1 \pm \sqrt{5} \end{aligned}$$

よって
 $x = 2, 1 \pm \sqrt{5}$