

# 式と証明 (公式)

## 展開

$$(\bigcirc + \triangle + \square)^2 = \bigcirc^2 + \triangle^2 + \square^2 + 2\bigcirc\triangle + 2\triangle\square + 2\square\bigcirc$$

$$(\bigcirc + \triangle)^3 = \bigcirc^3 + 3\bigcirc^2\triangle + 3\bigcirc\triangle^2 + \triangle^3$$

$$\begin{aligned}(\bigcirc - \triangle)^3 &= (\bigcirc + (-\triangle))^3 \\ &= \bigcirc^3 - 3\bigcirc^2(-\triangle) + 3\bigcirc(-\triangle)^2 - (-\triangle)^3 \\ &= \bigcirc^3 - 3\bigcirc^2\triangle + 3\bigcirc\triangle^2 - \triangle^3\end{aligned}$$

## 因数分解

$$\bigcirc^3 + \triangle^3 = (\bigcirc + \triangle)(\bigcirc^2 - \bigcirc\triangle + \triangle^2)$$

$$\bigcirc^3 - \triangle^3 = (\bigcirc - \triangle)(\bigcirc^2 + \bigcirc\triangle + \triangle^2)$$

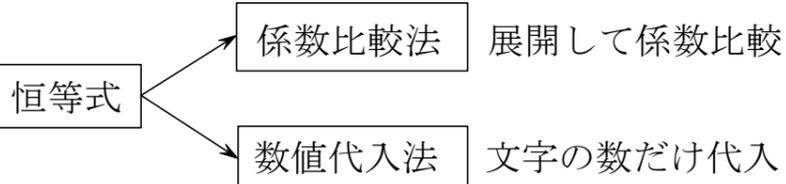
## 二項定理

$$\begin{aligned}(\bigcirc + \triangle)^4 \\ = {}_4C_0\bigcirc^4 + {}_4C_1\bigcirc^3\triangle^1 + {}_4C_2\bigcirc^2\triangle^2 + {}_4C_3\bigcirc^1\triangle^3 + {}_4C_4\triangle^4\end{aligned}$$

## 多項定理

$$\begin{aligned}(\bigcirc + \triangle + \square)^6 \\ \bigcirc^2\triangle\square^3 \text{の項は } \frac{6!}{2!1!3!}\bigcirc^2\triangle\square^3\end{aligned}$$

## 恒等式



## 等式の証明

(左辺)=(右辺) を示せ。

### 証明①

$$\begin{aligned}(\text{左辺}) &= \dots\dots \\ &= \dots\dots \\ &= (\text{右辺})\end{aligned}$$

### 証明②

$$\begin{aligned}(\text{左辺}) &= \dots\dots = \triangle \\ (\text{右辺}) &= \dots\dots = \triangle\end{aligned}$$

### 証明③

$$\begin{aligned}(\text{左辺}) - (\text{右辺}) &= \dots\dots \\ &= \dots\dots \\ &= 0\end{aligned}$$

## 不等式の証明

(左辺)>(右辺) を示せ。

### 証明

$$\begin{aligned}(\text{左辺}) - (\text{右辺}) &= \dots\dots \\ &= \dots\dots > 0\end{aligned}$$

(左辺)≥(右辺) を示せ。

### 証明

$$\begin{aligned}(\text{左辺}) - (\text{右辺}) &= \dots\dots \\ &= \dots\dots \geq 0\end{aligned}$$

等号成立を調べる

## 相加平均と相乗平均の大小関係

### 証明

$\bigcirc > 0, \triangle > 0$  のとき

$$\bigcirc + \triangle \geq 2\sqrt{\bigcirc\triangle}$$

等号成立は  $\bigcirc = \triangle$