



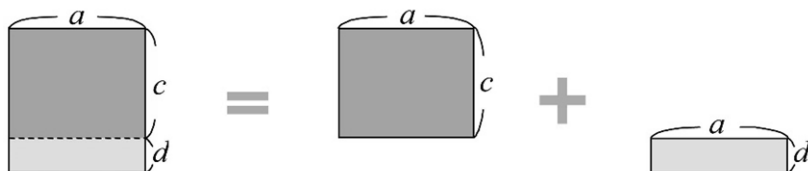
# B3 1-1 乘法公式



## 概念 ① 分配律 $a(b+c)=ab+ac$



下圖的長方形中，長是 $a$ 、寬是 $(c+d)$ ，面積表示成\_\_\_\_\_。



◎  $a(c+d) = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$

〈例〉

$18 \times (100+2) = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

☆筆記

①  $\star \times (100+2) =$

②  $\boxed{\hspace{1cm}} \times (100+2) =$

③  $18 \times (100+2) =$

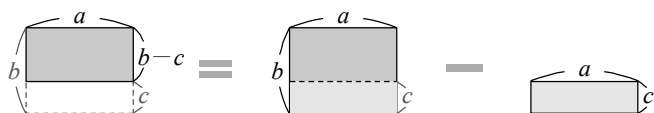
④  $\boxed{\hspace{1cm}} \times (100+2) =$



## 牛刀小試 1

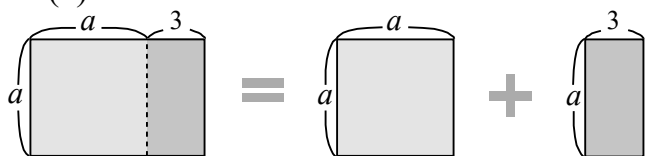
1. 利用分配律完成下列各式

(1)



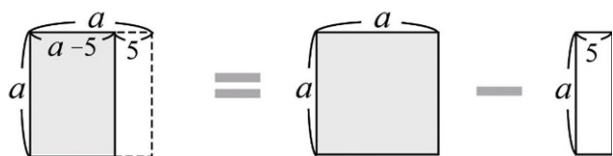
$a(b-c) = \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$

(2)



$a(a+3) = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$

(3)



$a(a-5) = \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$

2. 利用分配律計算下列各題

(1)  $a(b+5) = \underline{\hspace{2cm}}$

(2)  $a(b-7) = \underline{\hspace{2cm}}$

(3)  $a(a+2) = \underline{\hspace{2cm}}$

(4)  $a(a-9) = \underline{\hspace{2cm}}$

(5)  $12 \times (100+3)$   
 $= \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$   
 $= \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$   
 $= \underline{\hspace{2cm}}$

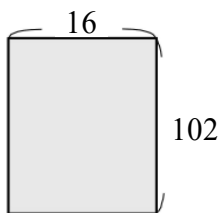
(6)  $12 \times (100-3)$   
 $= \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$   
 $= \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$   
 $= \underline{\hspace{2cm}}$



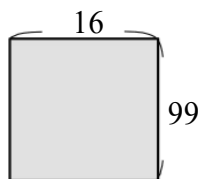
# 例題 ① 利用分配律求長方形面積



①



②



☆筆記

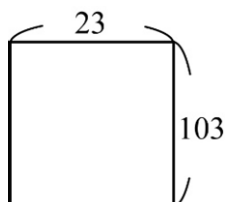


## 牛刀小試 2

1. 利用分配律求長方形面積（請寫出算式）

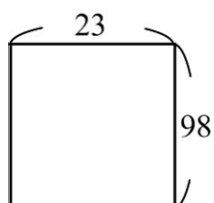
(1) 列式：

拆開：



(2) 列式：

拆開：



2. 求下列各值（請寫出算式）

(1)  $12 \times 106$

$$\begin{aligned}
 &= 12 \times (100 + \underline{\quad}) \\
 &= \underline{\quad} + \underline{\quad} \\
 &= \underline{\quad} + \underline{\quad} \\
 &= \underline{\quad}
 \end{aligned}$$

(2)  $6 \times 999$

$$\begin{aligned}
 &= 6 \times (1000 - \underline{\quad}) \\
 &= \underline{\quad} - \underline{\quad} \\
 &= \underline{\quad} - \underline{\quad} \\
 &= \underline{\quad}
 \end{aligned}$$

(3)  $12 \times 98$

$$=$$



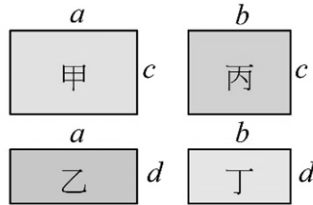
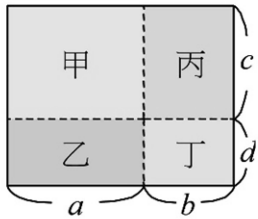
概念

## ② 分配律 $(a+b)(c+d) = ac + ad + bc + bd$



下圖的長方形中，長是 $(a+b)$ 、寬是 $(c+d)$ ，

面積可表示成\_\_\_\_\_。



合起來的面積  拆開來的面積

◎  $(a+b)(c+d)$   + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_

〈例〉

$$\begin{aligned} (200+1) \times (100+2) &= \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} \\ &= \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} \\ &= \underline{\hspace{2cm}} \end{aligned}$$

☆筆記

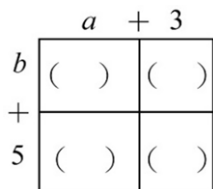


### 牛刀小試 3

1. 在空格中填入各長方形面積並計算總面積

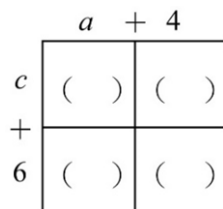
(1)  $(a+3)(b+5)$

=

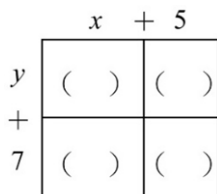


(2)  $(a+4)(c+6)$

=



(3)  $(x+5)(y+7)$



2. 利用分配律計算下列各題

(1)  $(x+8)(y+9)$

=

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

=

(3)  $(a+2)(b-3)$

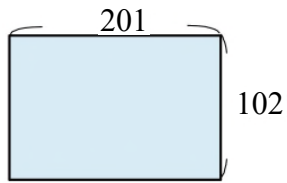
(4)  $(a-3)(b-4)$



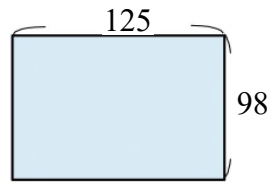
## 例題 ② 利用分配律求長方形面積



①



②

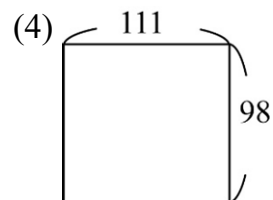
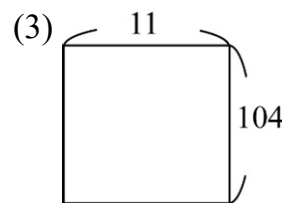
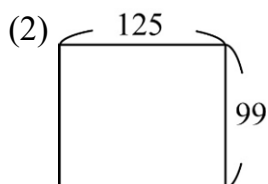
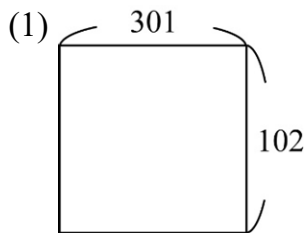


☆筆記



### 牛刀小試 4

1. 利用分配律求長方形面積（請寫出算式）



**例題****③****利用分配律計算**

(1)  $103 \times 107$

(2)  $99 \times 97$

☆筆記

利用分配律計算主要的目的

是\_\_\_\_\_

**牛刀小試 5****1. 利用分配律計算下列各題（請寫出算式）**

(1)  $104 \times 106$

$$= (\_\square\_\square) \times (\_\square\_\square)$$

$$= (\_\square)\square(\_\square)\square(\_\square)\square(\_\square)$$

$$= (\_\square)\square(\_\square)\square(\_\square)\square(\_\square)$$

$$= (\_\square)$$

(2)  $102 \times 101$

$$= (\_\square\_\square) \times (\_\square\_\square)$$

$$= (\_\square)\square(\_\square)\square(\_\square)\square(\_\square)$$

$$= (\_\square)\square(\_\square)\square(\_\square)\square(\_\square)$$

$$= (\_\square)$$

(3)  $102 \times 99$

**2. 利用分配律計算下列各題（請寫出算式）**

(1)  $99 \times 98$

$$= (\_\square\_\square) \times (\_\square\_\square)$$

$$= (\_\square)\square(\_\square)\square(\_\square)\square(\_\square)$$

$$= (\_\square)\square(\_\square)\square(\_\square)\square(\_\square)$$

$$= (\_\square)$$

(2)  $99 \times 97$

$$= (\_\square\_\square) \times (\_\square\_\square)$$

$$= (\_\square)\square(\_\square)\square(\_\square)\square(\_\square)$$

$$= (\_\square)\square(\_\square)\square(\_\square)\square(\_\square)$$

$$= (\_\square)$$

(3)  $98 \times 97$

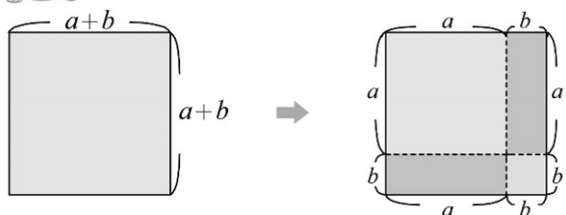


概念

③

和的平方公式  $(a+b)^2 = a^2 + 2ab + b^2$ 

$(a+b)^2 =$



〈例〉

$908^2 = (900 + \underline{\quad\quad})^2$

☆筆記

$908^2 = 900^2 + 8^2$  對嗎？

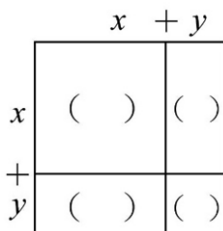


牛刀小試 6

1. 計算下列正方形面積

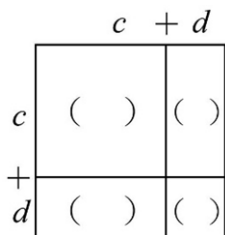
(1)  $(x+y)^2$

=



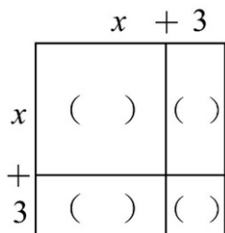
(2)  $(c+d)^2$

=



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

=



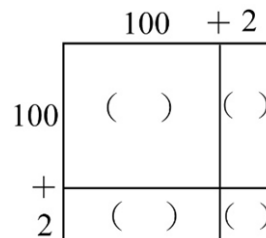
2. 計算下列正方形面積

(1)  $(100+2)^2$

=  $\underline{\quad\quad} + 2 \times \underline{\quad\quad} \times \underline{\quad\quad} + \underline{\quad\quad}$

=  $\underline{\quad\quad} + \underline{\quad\quad} + \underline{\quad\quad}$

=  $\underline{\quad\quad}$

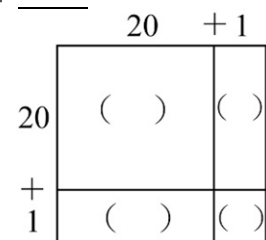


(2)  $(20+1)^2$

=  $\underline{\quad\quad} + 2 \times \underline{\quad\quad} \times \underline{\quad\quad} + \underline{\quad\quad}$

=  $\underline{\quad\quad} + \underline{\quad\quad} + \underline{\quad\quad}$

=  $\underline{\quad\quad}$



3. 判斷下列等式是否正確，若有錯誤請打✓並改正

(A)  $\square (10+2)^2 = 10^2 + 2^2$

更正：  $\underline{\quad\quad}$ 

(B)  $\square (10+3)^2 = 10^2 + 3 \times 10 + 3^2$

更正：  $\underline{\quad\quad}$ 

(C)  $\square (10+4)^2 = 10^2 + 2 \times 10 \times 4 + 4$

更正：  $\underline{\quad\quad}$

**例題****4****運用和的平方公式計算 1**(1)  $708^2$ (2)  $10.5^2$ 

☆筆記

**牛刀小試 7****1. 運用和的平方公式計算各題（請寫出算式）**(1)  $302^2$ 

$$= (\underline{\hspace{1cm}} \square \underline{\hspace{1cm}})^2$$

$$= \underline{\hspace{1cm}} + 2 \times \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} + \underline{\hspace{1cm}}$$

$$= \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}}$$

$$= \underline{\hspace{1cm}}$$

(2)  $405^2$ (3)  $104^2$ **2. 運用和的平方公式計算各題（請寫出算式）**(1)  $10.7^2$ 

$$= (\underline{\hspace{1cm}} \square \underline{\hspace{1cm}})^2$$

$$= \underline{\hspace{1cm}} + 2 \times \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} + \underline{\hspace{1cm}}$$

$$= \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}}$$

$$= \underline{\hspace{1cm}}$$

(2)  $10.6^2$ (3)  $100.8^2$



## 例題 5 運用和的平方公式計算 2



$$(1) 87^2 + 2 \times 87 \times 13 + 13^2 =$$

$$(2) (8\frac{1}{4})^2 =$$

$$(\underline{\quad} + \underline{\quad})^2 = \underline{\quad} + 2 \times \underline{\quad} \times \underline{\quad} + \underline{\quad}$$

☆筆記

$$87^2 + 26 \times 87 + 13^2 =$$



## 牛刀小試 8

### 1. 運用和的平方公式計算各題

$$(1) 25^2 + 2 \times 25 \times 5 + 5^2$$

$$(2) 98^2 + 2 \times 98 \times 2 + 2^2$$

$$(3) 39^2 + 2 \times 39 \times 61 + 61^2$$

$$\begin{aligned} (4) \quad & 78^2 + \underline{24} \times 78 + 12^2 \\ &= 78^2 + 2 \times \underline{\quad\quad\quad} \times 78 + 12^2 \\ &= \underline{\quad\quad\quad} \end{aligned}$$

$$\begin{aligned} (5) \quad & 93^2 + \underline{14} \times 93 + 7^2 \\ &= 93^2 + 2 \times \underline{\quad\quad\quad} \times 93 + 7^2 \\ &= \underline{\quad\quad\quad} \end{aligned}$$

$$\begin{aligned} (6) \quad & 47^2 + \underline{6} \times 47 + 3^2 \\ &= 47^2 + 2 \times \underline{\quad\quad\quad} \times 47 + 3^2 \\ &= \underline{\quad\quad\quad} \end{aligned}$$



概念

④

差的平方公式  $(a-b)^2 = a^2 - 2ab + b^2$  $(a-b)^2$ 

☆筆記

 $(11-1)^2 = 11^2 - 1^2$  對嗎？

〈例〉

$$499^2 = (500 - \underline{\quad})^2$$



牛刀小試 9

1. 運用差的平方公式計算各題

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

$$= \underline{\quad}^2 \times \underline{\quad} \times \underline{\quad}^2$$

$$= \underline{\quad}^2 \underline{\quad}^2$$

(2)  $(c-d)^2$

$$= \underline{\quad}^2 \times \underline{\quad} \times \underline{\quad}^2$$

$$= \underline{\quad}^2 \underline{\quad}^2$$

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

(4)  $(y-4)^2$

2. 運用差的平方公式計算下列各題（請寫出算式）

(1)  $(20-3)^2$

$$= \underline{\quad}^2 \times \underline{\quad} \times \underline{\quad}^2$$

(2)  $(100-1)^2$

3. 判斷下列各式是否正確，若有錯誤請更正

(A)  $\square (10-3)^2 = 10^2 - 3^2$

更正：\_\_\_\_\_

(B)  $\square (20-5)^2 = 20^2 - 2 \times 20 \times 5 - 5^2$

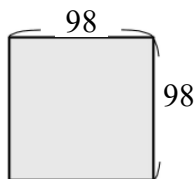
更正：\_\_\_\_\_

(C)  $\square (x-y)^2 = x^2 + 2xy - y^2$

更正：\_\_\_\_\_

**例題****6****運用差的平方公式計算 1**

(1) 求下列正方形面積

(2)  $98^2 =$ 

☆筆記

**牛刀小試 10****1. 運用差的平方公式計算各題（請寫出算式）**

(1)  $99^2 = (100 - \underline{\quad})^2$

$$= \underline{\quad}^2 \times \underline{\quad} \times \underline{\quad}^2$$

$$= \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}}$$

(2)  $96^2 = (100 - \underline{\quad})^2$

$$= \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}}$$

(3)  $94^2 = (100 - \underline{\quad})^2$

$$= \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}}$$

**2. 運用差的平方公式計算下列各題（請寫出算式）**

(1)  $199^2 = (200 - \underline{\quad})^2$

$$= \underline{\quad}^2 \times \underline{\quad} \times \underline{\quad}^2$$

$$= \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}}$$

(2)  $198^2 = (200 - \underline{\quad})^2$

$$= \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}}$$

(3)  $195^2 = (200 - \underline{\quad})^2$

$$= \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}}$$



## 例題 7 運用差的平方公式計算 2



(1)  $997^2$

(2)  $8.9^2$

☆筆記



### 牛刀小試 11

1. 運用差的平方公式計算下列各題

(1)  $999^2$

$= (1000 \square \text{ } \text{ } )^2$

(3)  $996^2$

(2)  $998^2$

$= (1000 \square \text{ } \text{ } )^2$

(4)  $995^2$

**例題****⑧ 運用差的平方公式計算 3**

(1)  $567^2 - 2 \times 567 \times 67 + 67^2 =$

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

☆筆記

 $(9\frac{1}{2})^2$  中的  $9\frac{1}{2}$  可以改成  $(9 + \frac{1}{2})$ 

嗎？

**牛刀小試 12**

1. 運用差的平方公式計算下列各題

(1)  $108^2 - 2 \times 108 \times 8 + 8^2$   
 $= (\underline{\hspace{1cm}} \square \underline{\hspace{1cm}})^2$

(2)  $123^2 - 2 \times 123 \times 23 + 23^2$   
 $= (\underline{\hspace{1cm}} \square \underline{\hspace{1cm}})^2$

(3)  $97^2 - 2 \times 97 \times 47 + 47^2$

(4)  $53^2 - \underline{6} \times 53 + 3^2$   
 $= 53^2 - 2 \times \underline{\hspace{1cm}} \times 53 + 3^2$   
 $= \underline{\hspace{2cm}}$

(5)  $42^2 - \underline{4} \times 42 + 2^2$   
 $= 42^2 - 2 \times \underline{\hspace{1cm}} \times 42 + 2^2$   
 $= \underline{\hspace{2cm}}$

(6)  $75^2 - \underline{10} \times 75 + 5^2$   
 $= 75^2 - 2 \times \underline{\hspace{1cm}} \times 75 + 5^2$   
 $= \underline{\hspace{2cm}}$



概念

⑤ 平方差公式  $(a+b)(a-b)=a^2-b^2$  $(a+b)(a-b)$ 

☆筆記

〈例〉

$$88 \times 72 = (\underline{\quad} + \underline{\quad})(\underline{\quad} - \underline{\quad}) = \underline{\quad}$$



## 牛刀小試 13

1. 運用平方差公式計算下列各式

(1)  $(x+y)(x-y)$

=

(2)  $(c+d)(c-d)$

=

(3)  $(x+3)(x-3)$

=

(4)  $(y+4)(y-4)$

=

2. 運用平方差公式計算下列各式

(1)  $52 \times 48$

$$= (50 + \underline{\quad})(50 - \underline{\quad})$$

$$= \underline{\quad} - \underline{\quad}$$

$$= \underline{\quad}$$

(2)  $108 \times 92$

$$= (100 + \underline{\quad})(100 - \underline{\quad})$$

$$= \underline{\quad} - \underline{\quad}$$

$$= \underline{\quad}$$

(3)  $65 \times 55$

$$= (\underline{\quad} + \underline{\quad})(\underline{\quad} - \underline{\quad})$$

$$= \underline{\quad} - \underline{\quad}$$

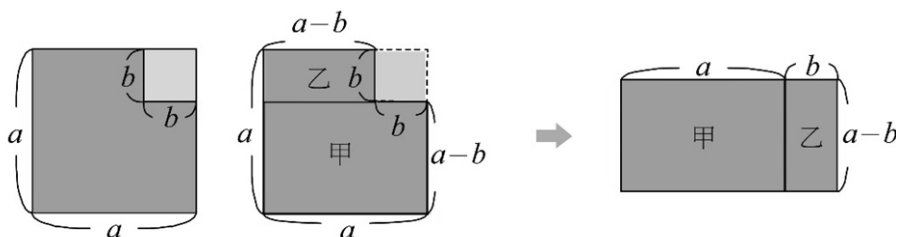
$$= \underline{\quad}$$



概念

⑥ 平方差公式  $a^2 - b^2 = (a+b)(a-b)$ 

$a^2 - b^2 =$



〈例〉

$83^2 - 17^2 =$

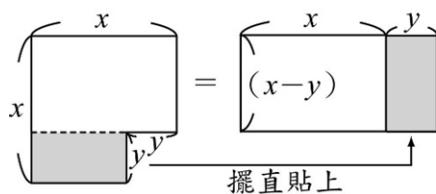
☆筆記



## 牛刀小試 14

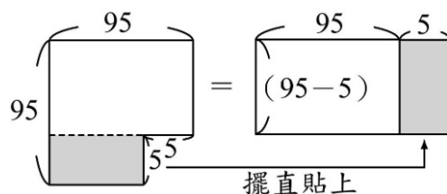
## 1. 運用平方差公式計算長方形面積

(1)



$x^2 - y^2 = (\quad + \quad) \times (\quad - \quad)$

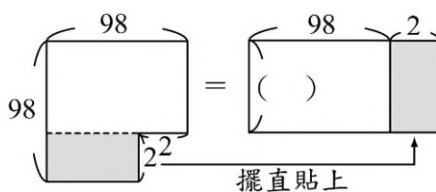
(2)



$95^2 - 5^2 = (95 + \quad) \times (95 - \quad)$

$= \quad \times \quad = \quad$

(3)



$98^2 - 2^2 = (98 + \quad) \times (98 - \quad)$

$= \quad \times \quad = \quad$

## 2. 運用平方差公式計算各題

(1)  $85^2 - 15^2$

$= (85 + \quad) \times (85 - \quad)$

$= \quad \times \quad$

$= \quad$

(2)  $93^2 - 7^2$

$= (93 + \quad) \times (93 - \quad)$

$= \quad \times \quad$

$= \quad$

(3)  $66^2 - 34^2$

$= (\quad + \quad) \times (\quad - \quad)$

$= \quad \times \quad$

$= \quad$



牛刀小試 15

2. 運用平方差公式計算下列各式（請寫出算式）

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$$(3) \quad (3\frac{1}{2})^2 - (2\frac{1}{2})^2$$



# 解 答 篇

## 牛刀小試 1

- $(1) a(b-c) = ab - ac$   
 $(2) a(a+3) = a^2 + 3a$   
 $(3) a(a+5) = a^2 - 5a$
- $(1) a(b+5) = ab + 5a$   
 $(2) a(b-7) = ab - 7a$   
 $(3) a(a+2) = a^2 + 2a$   
 $(4) a(a-9) = a^2 - 9a$   
 $(5) 12 \times (100+3) = 12 \times 100 + 12 \times 3 = 1200 + 36 = 1236$   
 $(6) 12 \times (100-3) = 12 \times 100 - 12 \times 3 = 1200 - 36 = 1164$

## 牛刀小試 2

- $(1)$  列式  $23 \times 103$   
 拆開  $= 23 \times (100+3) = 23 \times 100 + 23 \times 3 = 2369$   
 $(2)$  列式  $23 \times 98$   
 拆開  $= 23 \times (100-2) = 23 \times 100 - 23 \times 2 = 2254$
- $(1) 12 \times 106 = 12 \times (100+6) = 12 \times 100 + 12 \times 6 = 1200 + 72 = 1272$   
 $(2) 6 \times 999 = 6 \times (1000-1) = 6 \times 1000 - 6 \times 1 = 6000 - 6 = 5994$   
 $(3) 12 \times 98 = 12 \times (100-2) = 12 \times 100 - 12 \times 2 = 1200 - 24 = 1176$

## 牛刀小試 3

- $(1) (a+3)(b+5) = ab + 5a + 3b + 15$   

|        |        |        |
|--------|--------|--------|
| $b$    | $a+3$  |        |
| $(ab)$ | $(3b)$ |        |
| $5$    | $(5a)$ | $(15)$ |
- $(2) (a+4)(c+6) = ac + 6a + 4c + 24$

$$\begin{array}{r} a+4 \\ c \begin{array}{|c|c|} \hline (ac) & (4c) \\ \hline \end{array} \\ + \\ 6 \begin{array}{|c|c|} \hline (6a) & (24) \\ \hline \end{array} \end{array}$$

$$(3) (x+5)(y+7) = xy + 7x + 5y + 35$$

$$\begin{array}{r} x+5 \\ y \begin{array}{|c|c|} \hline (xy) & (5y) \\ \hline \end{array} \\ + \\ 7 \begin{array}{|c|c|} \hline (7x) & (35) \\ \hline \end{array} \end{array}$$

- $(1) (x+8)(y+9) = x \times y + 9 \times x + 8 \times y + 8 \times 9 = xy + 9x + 8y + 72$   
 $(2) (x-1)(y+2) = x \times y + 2 \times x - 1 \times y - 1 \times 2 = xy + 2x - y - 2$   
 $(3) (a+2)(b-3) = ab - 3a + 2b - 6$   
 $(4) (a-3)(b-4) = ab - 4a - 3b + 12$

## 牛刀小試 4

- $(1) 301 \times 102 = (300+1) \times (100+2) = 30000 + 600 + 100 + 2 = 30702$   
 $(2) 125 \times 99 = (100+25) \times (100-1) = 10000 - 100 + 2500 - 25 = 12375$   
 $(3) 11 \times 104 = (10+1) \times (100+4) = 1000 + 40 + 100 + 4 = 1144$   
 $(4) 111 \times 98 = (100+11) \times (100-2) = 10000 - 200 + 1100 - 22 = 10878$

## 牛刀小試 5

- $(1) (100+4) \times (100+6) = 100 \times 100 + 100 \times 6 + 4 \times 100 + 4 \times 6 = 10000 + 600 + 400 + 24 = 11024$   
 $(2) (100+2) \times (100+1) = 100 \times 100 + 100 \times 1 + 2 \times 100 + 2 \times 1 = 10000 + 100 + 200 + 2 = 10302$   
 $(3) (100+2) \times (100-1) = 10098$
- $(1) (100-1) \times (100-2) = 100 \times 100 - 100 \times 2 - 1 \times 100 + 1 \times 2 = 10000 - 200 - 100 + 2 = 9702$

- $(2) (100-1) \times (100-3) = 100 \times 100 - 100 \times 3 - 1 \times 100 + 1 \times 3 = 10000 - 300 - 100 + 3 = 9603$   
 $(3) (100-2) \times (100-3) = 9506$

## 牛刀小試 6

- $(1) (x+y)^2 = x^2 + 2xy + y^2$

$$\begin{array}{r} x+y \\ x \begin{array}{|c|c|} \hline x^2 & xy \\ \hline \end{array} \\ + \\ y \begin{array}{|c|c|} \hline xy & y^2 \\ \hline \end{array} \end{array}$$

$$(2) (c+d)^2 = c^2 + 2cd + d^2$$

$$\begin{array}{r} c+d \\ c \begin{array}{|c|c|} \hline c^2 & cd \\ \hline \end{array} \\ + \\ d \begin{array}{|c|c|} \hline cd & d^2 \\ \hline \end{array} \end{array}$$

$$(3) (x+3)^2 = x^2 + 6x + 9$$

$$\begin{array}{r} x+3 \\ x \begin{array}{|c|c|} \hline x^2 & 3x \\ \hline \end{array} \\ + \\ 3 \begin{array}{|c|c|} \hline 3x & 3^2 \\ \hline \end{array} \end{array}$$

- $(1) (100+2)^2 = 100^2 + 2 \times 100 \times 2 + 2^2 = 10404$

$$\begin{array}{r} 100+2 \\ 100 \begin{array}{|c|c|} \hline 100^2 & 100 \times 2 \\ \hline \end{array} \\ + \\ 2 \begin{array}{|c|c|} \hline 2 \times 100 & 2^2 \\ \hline \end{array} \end{array}$$

- $(2) (20+1)^2 = 20^2 + 2 \times 20 \times 1 + 1^2 = 441$

$$\begin{array}{r} 20+1 \\ 20 \begin{array}{|c|c|} \hline 20^2 & 20 \times 1 \\ \hline \end{array} \\ + \\ 1 \begin{array}{|c|c|} \hline 20 \times 1 & 1^2 \\ \hline \end{array} \end{array}$$

- (A) 錯，更正為  $(10+2)^2 = 10^2 + 2 \times 10 \times 2 + 2^2$   
 (B) 錯，更正為  $(10+3)^2 = 10^2 + 2 \times 10 \times 3 + 3^2$   
 (C) 錯，更正為  $(10+4)^2 = 10^2 + 2 \times 10 \times 4 + 4^2$

## 牛刀小試 7

- $(1) 302^2 = (300+2)^2 = 300^2 + 2 \times 300 \times 2 + 2^2 = 90000 + 1200 + 4 = 91204$   
 $(2) 405^2 = (400+5)^2 = 400^2 + 2 \times 400 \times 5 + 5^2 = 160000 + 4000 + 25 = 164025$

$$\begin{aligned}(3) 104^2 &= (100+4)^2 \\ &= 10000 + 800 + 16 \\ &= 10816\end{aligned}$$

2.

$$\begin{aligned}(1) 10.7^2 &= (10+0.7)^2 \\ &= 10^2 + 2 \times 10 \times 0.7 + 0.7^2 \\ &= 100 + 14 + 0.49 \\ &= 114.49\end{aligned}$$

$$\begin{aligned}(2) 10.6^2 &= (10+0.6)^2 \\ &= 100 + 12 + 0.36 \\ &= 112.36\end{aligned}$$

$$\begin{aligned}(3) 100.5^2 &= (100+0.5)^2 \\ &= 10000 + 100 + 0.25 \\ &= 10100.25\end{aligned}$$

#### 牛刀小試 8

1.

$$\begin{aligned}(1) (25+5)^2 &= 900 \\ (2) (98+2)^2 &= 10000 \\ (3) (39+61)^2 &= 10000 \\ (4) 78^2 + 2 \times 12 \times 78 + 12^2 &= (78+12)^2 \\ &= 8100 \\ (5) 93^2 + 2 \times 7 \times 93 + 7^2 &= (93+7)^2 \\ &= 10000 \\ (6) 47^2 + 2 \times 3 \times 47 + 3^2 &= (47+3)^2 \\ &= 2500\end{aligned}$$

#### 牛刀小試 9

1.

$$\begin{aligned}(1) (x-y)^2 &= x^2 - 2xy + y^2 \\ (2) (c-d)^2 &= c^2 - 2cd + d^2 \\ (3) (x-3)^2 &= x^2 - 6x + 9 \\ (4) (y-4)^2 &= y^2 - 8y + 16\end{aligned}$$

2.

$$\begin{aligned}(1) (20-3)^2 &= 20^2 - 2 \times 20 \times 3 + 3^2 \\ &= 289\end{aligned}$$

$$\begin{aligned}(2) (100-1)^2 &= 100^2 - 2 \times 100 \times 1 + 1^2 \\ &= 9801\end{aligned}$$

3. (A) 錯，

$$\begin{aligned}\text{更正：} (10-3)^2 &= 10^2 - 2 \times 10 \times 3 + 3^2\end{aligned}$$

(B) 錯，

$$\begin{aligned}\text{更正：} (20-5)^2 &= 20^2 - 2 \times 20 \times 5 + 5^2\end{aligned}$$

(C) 錯，

$$\begin{aligned}\text{更正：} (x-y)^2 &= x^2 - 2xy + y^2\end{aligned}$$

#### 牛刀小試 10

1.

$$(1) 99^2$$

$$\begin{aligned}&= (100-1)^2 \\ &= 100^2 - 2 \times 100 \times 1 + 1^2 \\ &= 10000 - 200 + 1 \\ &= 9801\end{aligned}$$

(2)  $96^2$

$$\begin{aligned}&= (100-4)^2 \\ &= 10000 - 800 + 16 \\ &= 9216\end{aligned}$$

(3)  $94^2$

$$\begin{aligned}&= (100-6)^2 \\ &= 10000 - 1200 + 36 \\ &= 8836\end{aligned}$$

2.

(1)  $199^2$

$$\begin{aligned}&= (200-1)^2 \\ &= 200^2 - 2 \times 200 \times 1 + 1^2 \\ &= 40000 - 400 + 1 \\ &= 39601\end{aligned}$$

(2)  $198^2$

$$\begin{aligned}&= (200-2)^2 \\ &= 40000 - 800 + 4 \\ &= 39204\end{aligned}$$

(3)  $195^2$

$$\begin{aligned}&= (200-5)^2 \\ &= 40000 - 2000 + 25 \\ &= 38025\end{aligned}$$

#### 牛刀小試 11

1.

$$\begin{aligned}(1) 999^2 &= (1000-1)^2 = 998001 \\ (2) 998^2 &= (1000-2)^2 = 996004 \\ (3) 996^2 &= (1000-4)^2 = 992016 \\ (4) 995^2 &= (1000-5)^2 = 990025\end{aligned}$$

#### 牛刀小試 12

1.

$$\begin{aligned}(1) (108-8)^2 &= 10000 \\ (2) (123-23)^2 &= 10000 \\ (3) (97-47)^2 &= 2500 \\ (4) 53-2 \times 3 \times 53 + 3^2 &= (53-3)^2 = 2500 \\ (5) 42-2 \times 2 \times 42 + 2^2 &= (42-2)^2 = 1600 \\ (6) 75-2 \times 5 \times 75 + 5^2 &= (75-5)^2 = 4900\end{aligned}$$

2.

$$(1) (20-\frac{1}{4})^2 = 390\frac{1}{16}$$

$$(2) (10-\frac{1}{5})^2 = 96\frac{1}{25}$$

$$(3) (9-\frac{1}{9})^2 = 79\frac{1}{81}$$

$$(4) (6-\frac{1}{3})^2 = 32\frac{1}{9}$$

#### 牛刀小試 13

1.

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

$$(2) c^2 - d^2$$

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

$$(4) y^2 - 16$$

2.

$$\begin{aligned}(1) 52 \times 48 &= (50+2)(50-2) \\ &= 50^2 - 2^2 \\ &= 2496\end{aligned}$$

(2)  $108 \times 92$

$$\begin{aligned}&= (100+8)(100-8) \\ &= 100^2 - 8^2 \\ &= 9936\end{aligned}$$

(3)  $65 \times 55$

$$\begin{aligned}&= (60+5)(60-5) \\ &= 60^2 - 5^2 \\ &= 3575\end{aligned}$$

#### 牛刀小試 14

1.

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

(2)  $95^2 - 5^2$

$$\begin{aligned}&= (95+5)(95-5) \\ &= 100 \times 90 \\ &= 9000\end{aligned}$$

(3)  $98-2$ ，

$$\begin{aligned}98^2 - 2^2 &= (98+2)(98-2) \\ &= 100 \times 96 \\ &= 9600\end{aligned}$$

2.

$$\begin{aligned}(1) 85^2 - 15^2 &= (85+15)(85-15) \\ &= 100 \times 70 \\ &= 7000\end{aligned}$$

(2)  $93^2 - 7^2$

$$\begin{aligned}&= (93+7)(93-7) \\ &= 100 \times 86 \\ &= 8600\end{aligned}$$

(3)  $66^2 - 34^2$

$$\begin{aligned}&= (66+34)(66-34) \\ &= 100 \times 32 \\ &= 3200\end{aligned}$$

#### 牛刀小試 15

1.

$$\begin{aligned}(1) 102 \times 98 &= (100+2)(100-2) \\ &= 10000 - 4 \\ &= 9996\end{aligned}$$

(2)  $105 \times 95$

$$\begin{aligned}&= (100+5)(100-5) \\ &= 10000 - 25 \\ &= 9975\end{aligned}$$

$$(3) 10\frac{1}{2} \times 9\frac{1}{2}$$

$$= \left(10 + \frac{1}{2}\right) \times \left(10 - \frac{1}{2}\right)$$

$$= 10^2 - \left(\frac{1}{2}\right)^2$$

$$= 99\frac{3}{4}$$

2.

$$(1) 19^2 - 1^2$$

$$= (19 + 1) \times (19 - 1)$$

$$= 20 \times 18$$

$$= 360$$

$$(2) 123^2 - 23^2$$

$$= (123 + 23) \times (123 - 23)$$

$$= 146 \times 100$$

$$= 14600$$

$$(3) \left(3\frac{1}{2}\right)^2 - \left(2\frac{1}{2}\right)^2$$

$$= \left(3\frac{1}{2} + 2\frac{1}{2}\right) \times \left(3\frac{1}{2} - 2\frac{1}{2}\right)$$

$$= 6 \times 1$$

$$= 6$$