



B3 2-3 畢氏定理



概念 ① 畢氏定理



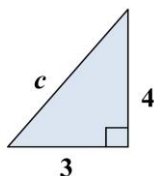
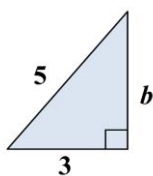
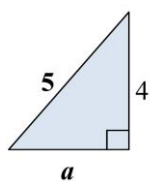
畢氏定理

假設直角三角形斜邊長是 c ，兩股長分別是 a 和 b ，則_____。

※畢氏定理又稱為_____

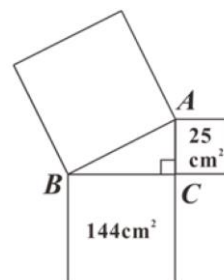
〈例〉

求下列 a 、 b 、 c 的值。



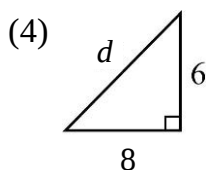
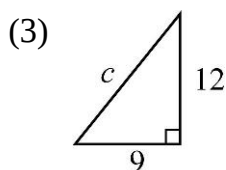
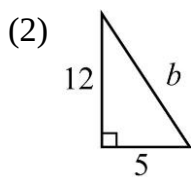
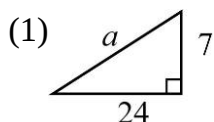
斜邊怎麼找？答：_____。

☆筆記

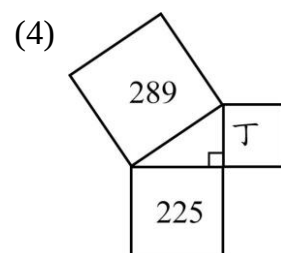
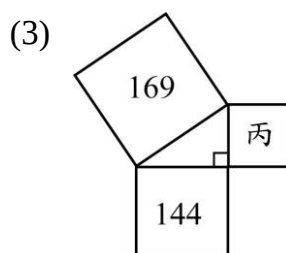
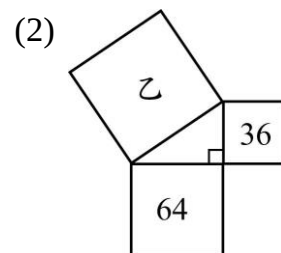
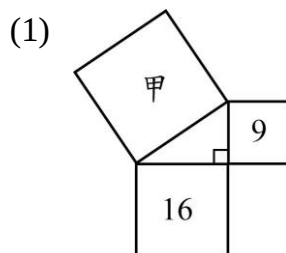


牛刀小試 ①

1. 求直角△的斜邊長



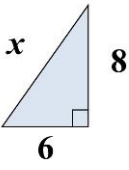
2. 下列各題以直角△三邊長為邊的正方形，求正方形面積。

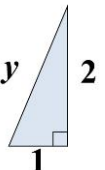


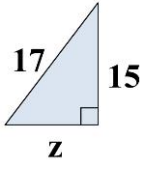


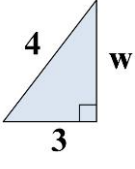
例題 ① 利用畢氏定理求直角三角形邊長



① 
 $x = \underline{\hspace{2cm}}$ 。

② 
 $y = \underline{\hspace{2cm}}$ 。

③ 
 $z = \underline{\hspace{2cm}}$ 。

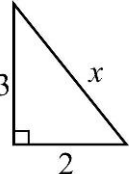
④ 
 $w = \underline{\hspace{2cm}}$ 。

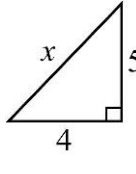
☆筆記

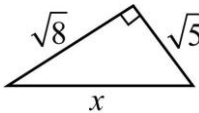


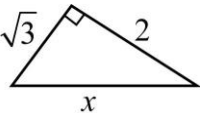
牛刀小試 2

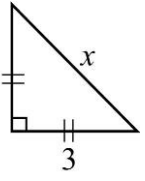
1. 求直角△邊長

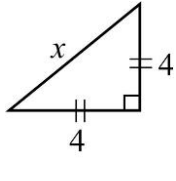
(1) 
 $x = \underline{\hspace{2cm}}$

(2) 
 $x = \underline{\hspace{2cm}}$

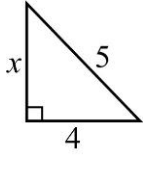
(3) 
 $x = \underline{\hspace{2cm}}$

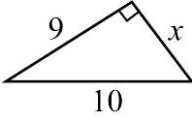
(4) 
 $x = \underline{\hspace{2cm}}$

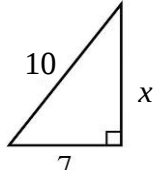
(5) 
 $x = \underline{\hspace{2cm}}$

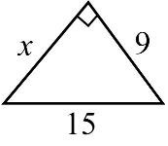
(6) 
 $x = \underline{\hspace{2cm}}$

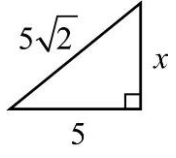
2. 求直角△邊長

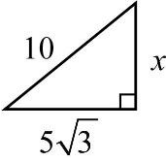
(1) 
 $x = \underline{\hspace{2cm}}$

(2) 
 $x = \underline{\hspace{2cm}}$

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

(4) 
 $x = \underline{\hspace{2cm}}$

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

(6) 
 $x = \underline{\hspace{2cm}}$



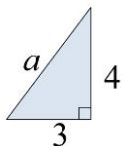
概念

② 常見的直角三角形三邊長



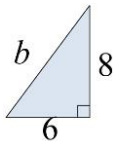
☆筆記

①



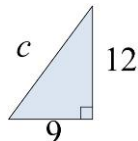
$$a = \underline{\hspace{2cm}}.$$

②



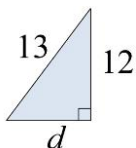
$$b = \underline{\hspace{2cm}}.$$

③



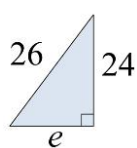
$$c = \underline{\hspace{2cm}}.$$

④



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

⑤



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



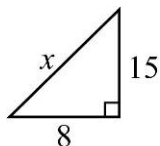
從上面例子，你發現了什麼？



牛刀小試 3

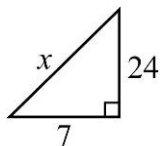
1. 求直角△邊長

(1)



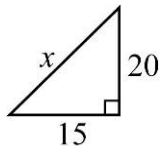
$$x = \underline{\hspace{2cm}}$$

(2)



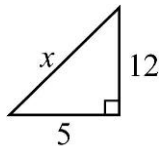
$$x = \underline{\hspace{2cm}}$$

(3)



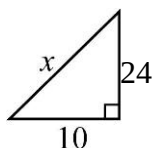
$$x = \underline{\hspace{2cm}}$$

(4)



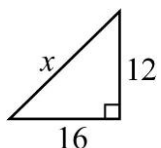
$$x = \underline{\hspace{2cm}}$$

(5)



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

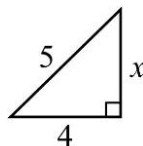
(6)



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

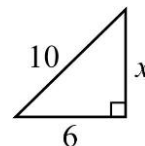
2. 求直角△邊長

(1)



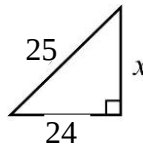
$$x = \underline{\hspace{2cm}}$$

(2)



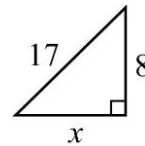
$$x = \underline{\hspace{2cm}}$$

(3)



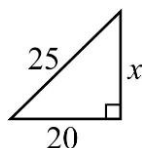
$$x = \underline{\hspace{2cm}}$$

(4)



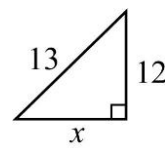
$$x = \underline{\hspace{2cm}}$$

(5)



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

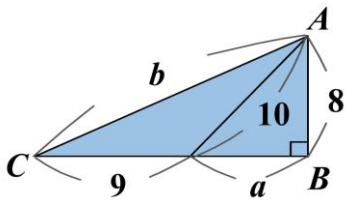
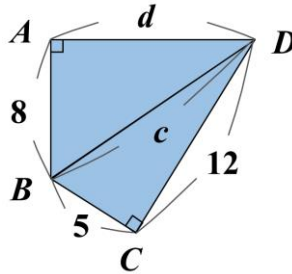
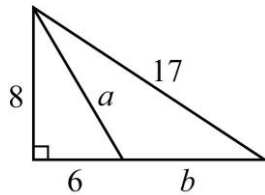
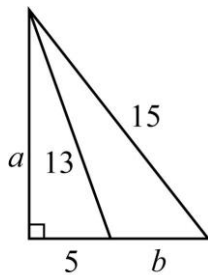
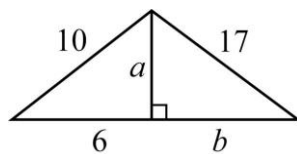
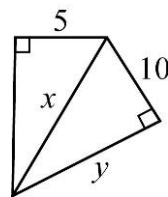
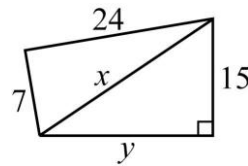
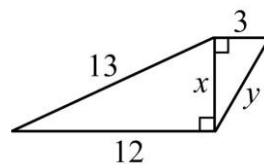
(6)



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

**例題****②****利用畢氏定理求複合圖形的邊長****〈例〉** 求出下列各圖中邊長 a 、 b 、 c 、 d 的值。

☆筆記

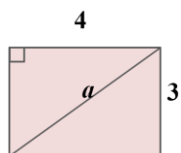
①**②****牛刀小試 4****1. 求各題邊長****(1)** $a = \underline{\hspace{2cm}}, b = \underline{\hspace{2cm}}$ **(2)** $a = \underline{\hspace{2cm}}, b = \underline{\hspace{2cm}}$ **(3)** $a = \underline{\hspace{2cm}}, b = \underline{\hspace{2cm}}$ **2. 求各題邊長****(1)** $x = \underline{\hspace{2cm}}, y = \underline{\hspace{2cm}}$ **(2)** $x = \underline{\hspace{2cm}}, y = \underline{\hspace{2cm}}$ **(3)** $x = \underline{\hspace{2cm}}, y = \underline{\hspace{2cm}}$



利用畢氏定理，求出下列長方形的對角線長。

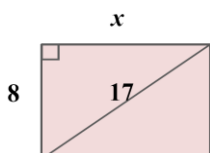
☆筆記

①



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

②



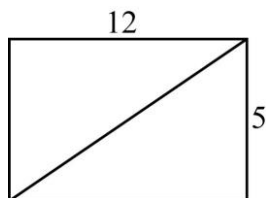
$$x = \underline{\hspace{2cm}}$$



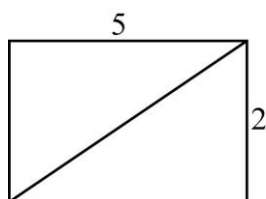
牛刀小試 5

1. 利用畢氏定理，求長方形對角線長

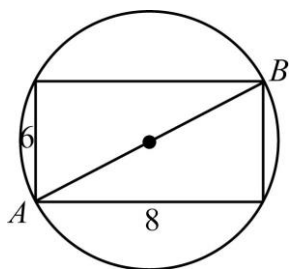
(1)



(2)

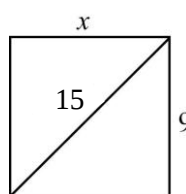


2. 有一長方形四個頂點都在圓周上，請問此圓直徑？



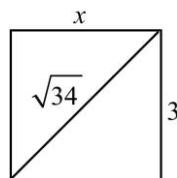
3. 利用畢氏定理，求長方形邊長及面積

(1)



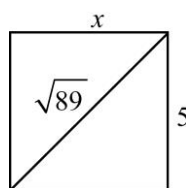
$$x = \underline{\hspace{2cm}}, \text{ 面積} = \underline{\hspace{2cm}}$$

(2)



$$x = \underline{\hspace{2cm}}, \text{ 面積} = \underline{\hspace{2cm}}$$

(3)



$$x = \underline{\hspace{2cm}}, \text{ 面積} = \underline{\hspace{2cm}}$$

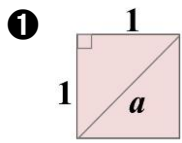


例題 ③ 正方形的對角線長

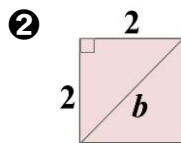


利用畢氏定理，求出下列各正方形的對角線長。

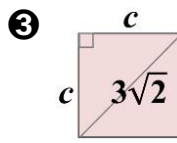
☆筆記



$a = \underline{\hspace{2cm}}$ 。



$b = \underline{\hspace{2cm}}$ 。

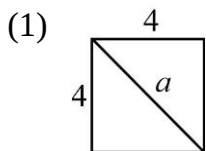


$c = \underline{\hspace{2cm}}$ 。

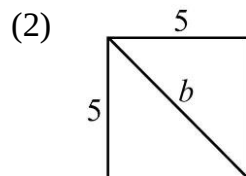


牛刀小試 6

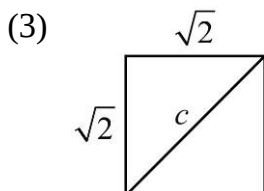
1. 利用畢氏定理，求正方形對角線長



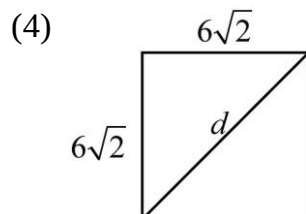
$a = \underline{\hspace{2cm}}$



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

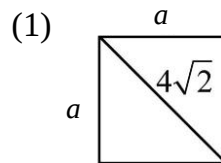


$c = \underline{\hspace{2cm}}$

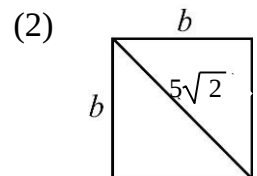


$d = \underline{\hspace{2cm}}$

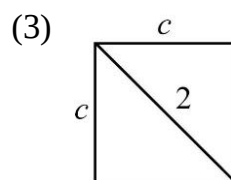
2. 利用畢氏定理，求正方形邊長



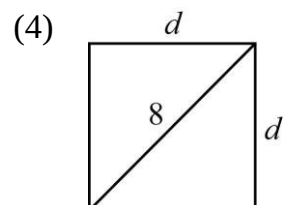
$a = \underline{\hspace{2cm}}$



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



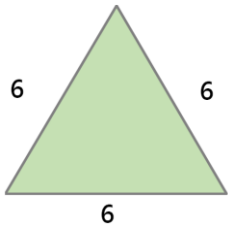
$c = \underline{\hspace{2cm}}$



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

**例題****4****正三角形的高和面積**

已知：正三角形邊長為 6，求這個正三角形的高與面積。

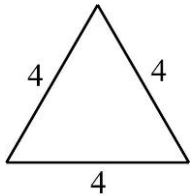


☆筆記

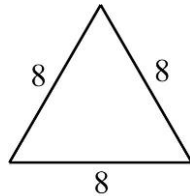
**牛刀小試 7**

1. 求出下列正△的高與面積

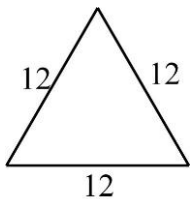
(1)



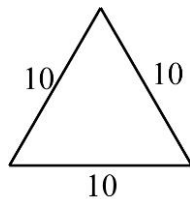
(2)



(3)

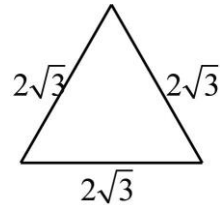


(4)

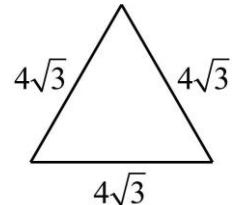


2. 求出下列正△的高與面積

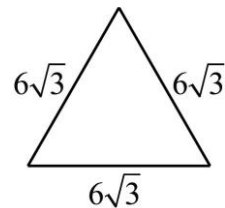
(1)



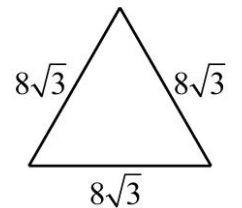
(2)



(3)

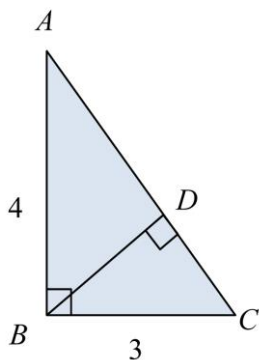


(4)





求直角 $\triangle ABC$ 斜邊上的高 $\overline{BD}$ 為多少？



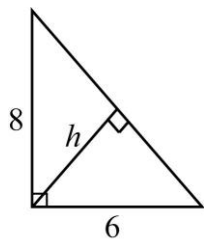
☆筆記



牛刀小試 8

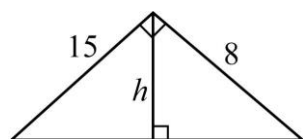
1. 求直角 $\triangle$ 斜邊上的高

(1)



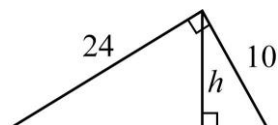
$$h = \underline{\hspace{2cm}}$$

(2)



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

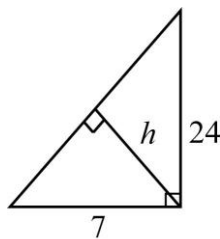
(3)



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

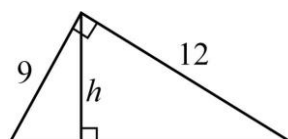
2. 求直角 $\triangle$ 斜邊上的高

(1)



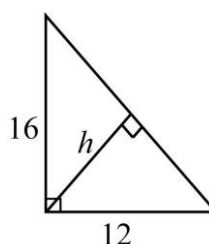
$$h = \underline{\hspace{2cm}}$$

(2)



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

(3)



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



已知數線上有兩點 $A(a)$ 、 $B(b)$ ，

則 A 、 B 兩點距離 $\overline{AB} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$ 。

〈例〉數線上的兩點距離

❶ $A(3)$ 、 $B(5)$ ， $\overline{AB} = \underline{\hspace{2cm}}$ 。

❷ $C(3)$ 、 $D(-2)$ ， $\overline{CD} = \underline{\hspace{2cm}}$ 。

〈例〉坐標平面上兩點的距離。

❶ $A(3, 2)$ 、 $B(5, 2)$ ， $\overline{AB} = \underline{\hspace{2cm}}$ 。

❷ $C(1, 3)$ 、 $D(1, -2)$ ， $\overline{CD} = \underline{\hspace{2cm}}$ 。

☆筆記



牛刀小試 9

1. 求出數線上兩點的距離

(1) $A(3)$ 、 $B(-1)$ ， $\overline{AB} = \underline{\hspace{2cm}}$

(2) $C(2)$ 、 $D(7)$ ， $\overline{CD} = \underline{\hspace{2cm}}$

(3) $E(-3)$ 、 $F(-9)$ ， $\overline{EF} = \underline{\hspace{2cm}}$

(4) $G(-4)$ 、 $H(9)$ ， $\overline{GH} = \underline{\hspace{2cm}}$

2. 求出數線上兩點的距離

(1) $A(4, 5)$ 、 $B(4, 7)$ ， $\overline{AB} = \underline{\hspace{2cm}}$

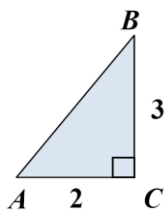
(2) $C(0, -1)$ 、 $D(0, 4)$ ， $\overline{CD} = \underline{\hspace{2cm}}$

(3) $E(-3, -5)$ 、 $F(-8, -5)$ ， $\overline{EF} = \underline{\hspace{2cm}}$

(4) $G(2, 3)$ 、 $H(-4, 3)$ ， $\overline{GH} = \underline{\hspace{2cm}}$



1. 複習畢氏定理：已知： $\overline{AC} = x$ ， $\overline{BC} = 3$ ，求 $\overline{AB} = ?$



2. 在坐標平面上， $A(1, 2)B(3, 5)$ ，求 $\overline{AB} = ?$



坐標平面上兩點距離公式

☆筆記



牛刀小試 10

1. 求出數線上兩點的距離

(1) $A(0, -3)$ 、 $B(0, -4)$ ， $\overline{AB} = \underline{\hspace{2cm}}$

(2) $C(5, 0)$ 、 $D(0, -12)$ ， $\overline{CD} = \underline{\hspace{2cm}}$

(3) $E(9, 3)$ 、 $F(3, 11)$ ， $\overline{EF} = \underline{\hspace{2cm}}$

(4) $G(4, -1)$ 、 $H(-2, 7)$ ， $\overline{GH} = \underline{\hspace{2cm}}$

2. 求出數線上兩點的距離

(1) $A(7, 3)$ 、 $B(-2, 9)$ ， $\overline{AB} = \underline{\hspace{2cm}}$

(2) $C(-5, -7)$ 、 $D(5, 3)$ ， $\overline{CD} = \underline{\hspace{2cm}}$

(3) $E(5, 1)$ 、 $F(1, -3)$ ， $\overline{EF} = \underline{\hspace{2cm}}$

(4) $G(-3, -5)$ 、 $H(-2, 4)$ ， $\overline{GH} = \underline{\hspace{2cm}}$



牛刀小試 1

1.
 - (1) $a=25$
 - (2) $b=13$
 - (3) $c=15$
 - (4) $d=10$
2.
 - (1) 甲 $=25$
 - (2) 乙 $=100$
 - (3) 丙 $=25$
 - (4) 丁 $=64$

牛刀小試 2

1.
 - (1) $x=\sqrt{13}$
 - (2) $x=\sqrt{41}$
 - (3) $x=\sqrt{13}$
 - (4) $x=\sqrt{7}$
 - (5) $x=3\sqrt{2}$
 - (6) $x=4\sqrt{2}$
2.
 - (1) $x=3$
 - (2) $x=\sqrt{19}$
 - (3) $x=\sqrt{51}$
 - (4) $x=12$
 - (5) $x=5$
 - (6) $x=5$

牛刀小試 3

1.
 - (1) $x=17$
 - (2) $x=25$
 - (3) $x=7$
 - (4) $x=13$
 - (5) $x=26$
 - (6) $x=20$

2.

- (1) $x=3$
- (2) $x=8$
- (3) $x=12$
- (4) $x=15$
- (5) $x=15$
- (6) $x=5$

牛刀小試 4

1.
 - (1) $a=10, b=9$
 - (2) $a=12, b=4$
 - (3) $a=8, b=15$

2.

- (1) $x=13, y=\sqrt{69}$
- (2) $x=25, y=20$
- (3) $x=5, y=\sqrt{34}$

牛刀小試 5

1.
 - (1) 13
 - (2) $\sqrt{29}$
2. 10
3.
 - (1) $x=12$, 面積 $=108$
 - (2) $x=5$, 面積 $=15$
 - (3) $x=8$, 面積 $=40$

牛刀小試 6

1.
 - (1) $4\sqrt{2}$
 - (2) $5\sqrt{2}$
 - (3) 2
 - (4) 12
2.
 - (1) 4
 - (2) 5
 - (3) $\sqrt{2}$
 - (4) $4\sqrt{2}$

牛刀小試 7

1.
 - (1) 高 $=2\sqrt{3}$, 面積 $=4\sqrt{3}$
 - (2) 高 $=4\sqrt{3}$, 面積 $=16\sqrt{3}$
 - (3) 高 $=6\sqrt{3}$, 面積 $=36\sqrt{3}$
 - (4) 高 $=5\sqrt{3}$, 面積 $=25\sqrt{3}$
2.
 - (1) 高 $=3$, 面積 $=3\sqrt{3}$
 - (2) 高 $=6$, 面積 $=12\sqrt{3}$
 - (3) 高 $=9$, 面積 $=27\sqrt{3}$
 - (4) 高 $=12$, 面積 $=48\sqrt{3}$

牛刀小試 8

1.
 - (1) $h=\frac{24}{5}$
 - (2) $h=\frac{120}{17}$
 - (3) $h=\frac{120}{13}$

2.

- (1) $h=\frac{168}{25}$
- (2) $h=\frac{36}{5}$
- (3) $h=\frac{48}{5}$

牛刀小試 9

1.
 - (1) 4
 - (2) 5
 - (3) 6
 - (4) 13
2.
 - (1) 2
 - (2) 5
 - (3) 5
 - (4) 6

牛刀小試 10

1.
 - (1) 5
 - (2) 13
 - (3) 10
 - (4) 10
2.
 - (1) $\sqrt{117}$
 - (2) $10\sqrt{2}$
 - (3) $4\sqrt{2}$
 - (4) $\sqrt{82}$