

vc h.k)

~ Robinson

● 計數機玩法： [Prog A2] Quadratic Functions 二次函數

Program A2. [4台] Quadratic Functions 二次函數 (95 bytes)	
MODE : 2 (CMPLX)	
ClrMemory : ? → A : ? → B : ? → M : B ² - 4AM → D ▲ -B ↓ (2A → C ▲ -D ↓ (4A ▲ AC ² M ⁻ : C +	46
√(-M ↓ A → X ▲ 2C - X → Y ▲ M M ⁻ : C ▲ π : Sci 8 : While Ans ≠ Rnd(Ans M+ : √(D ↓ M :	83
WhileEnd : Norm 1 : Ans ↓ (2A ▲ M	95

輸入

顯示

$$\Delta = \square$$

Vertex 頂點 = (,)

$$\square x^2 + \square x + \square = 0$$



$$x = \square \text{ or 或 } \square$$

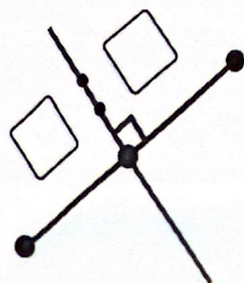
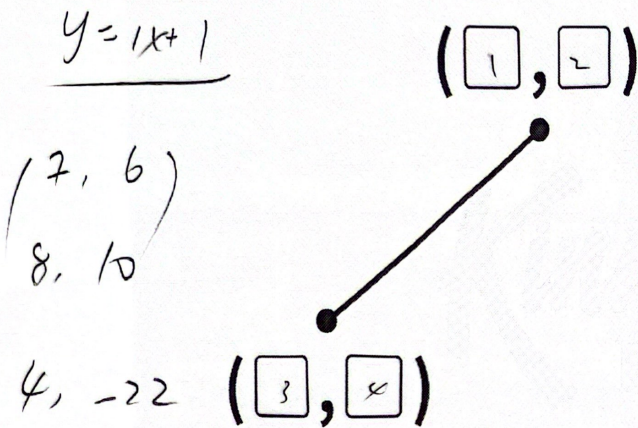
$$x = \square \pm \square \sqrt{\square}$$

● 計數機玩法：【Prog B1】 Equations of Straight Lines 直線方程

Program B1. 【7合1】 Equations of Straight Lines 直線方程 (105 bytes)	
MODE: 1 (COMP)	
ClrMemory: ? → A: ? → B: ? → C: ? → D: Pol(A - C, B - D ▲ (B - D) ⁻¹ (A - C → M ▲ B - Ans	43
A ▲ ? → X: ? → Y: (AY + CX) ⁻¹ (X + Y → X ▲ Ans M + B - AM → Y ▲ -1 ⁻¹ M ▲ Y - Ans X ▲	88

輸入

顯示



Distance
距離

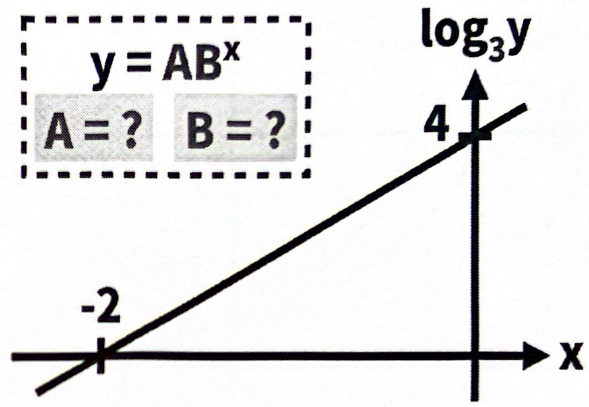
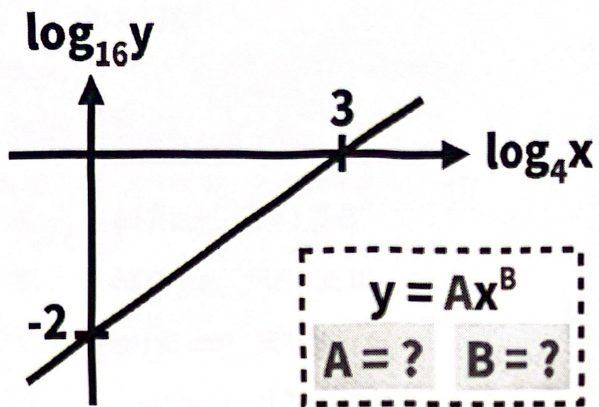
Equation
方程 $y = \square x + \square$

Point
點 (\square, \square)

Equation
方程 $y = \square x + \square$

● 計數機玩法：【Prog C1】 Log Transformation 對數變換

Program C1. Logarithmic Transformation 對數變換 (77 bytes)	
MODE: 1 (COMP)	
ClrMemory: ? → X: ? → Y: ? → A: ? → B: ? → C: ? → D: (B - D) ↓ (A - C → M: If X = 0: Then	45
Y ^ (B - AM) ▲ Y ^ (M) ▲ Else X ^ ((B - AM) ↓ log(Y, X) ▲ M ↓ log(Y, X)	77



🔪 Kingsley方法：神級計數機程式

x底 y底 點 點
 (,) (,)

A **B**

🔪 Kingsley方法：神級計數機程式

x底 y底 點 點
 (,) (,)

A **B**

Prog A A1

計數機玩法：【Prog A4】ASGS 等差等比數列

Program A4. [12合] ASGS 等差等比數列 (306 bytes)	
MODE: 1 (COMP)	
ClrMemory: ? → A: ? → B: ? → X: ? → C: ? → Y: ? → M: If A = 1: Then (X - Y) ↓ (B - C → D	44
▲ X - BD + D → A ▲ A + DM - D ▲ AM + DM (M - 1) ↓ 2 ▲ D ▲ A - D ▲ D ↓ 2 ▲ A - D ↓ 2 ▲	90
IfEnd: If A = 2: Then (X ↓ Y) ^ (B - C) ↓ → D: IfEnd: If sin(90 (B - C)) = 0: Then Goto 9: Else	133
⇒ Goto 8: Lbl 8: D ▲ X ↓ (D ^ (B - 1) → A ▲ AD ^ (M - 1 ▲ A (1 - D ^ (M))) ↓ (1 - D ▲ IfEnd: If	178
⇒ Abs(D) ≥ 1: Then 0 ↓ : Else A ↓ (1 - D ▲ Lbl 9: D ▲ -D ▲ X ↓ (D ^ (B - 1) → A ▲ X ↓ ((-D) ^ (B -	225
⇒ 1 → B ▲ AD ^ (M - 1 ▲ B (-D) ^ (M - 1 ▲ A (1 - D ^ (M))) ↓ (1 - D ▲ B (1 - (-D) ^ (M))) ↓ (1 + D	278
⇒ ▲ If Abs(D) ≥ 1: Then 0 ↓ : Else A ↓ (1 - D ▲ B ↓ (1 + D ▲ IfEnd	306

輸入

顯示

- 選擇功能
- AS 等差數列: 1
 - GS 等比數列: 2

step 0.

$a_1 = -17$
 $a_2 = -5$
 $a_x = ?$



common ↓ diff
 $d =$
 $a_1 =$
 $a_x =$
 $S_x =$
 第 n term ← $a_n = 2n + (-19)$
 sum of n term ← $S_n = 1n^2 + (-18)n$

● 計數機玩法：【Prog A4】ASGS 等差等比數列

輸入

顯示

選擇功能

1. AS 等差數列：1

2. GS 等比數列：2

$$a_{\square} = \square$$

$$a_{\square} = \square$$

$$a_{\square} = ?$$



$$r =$$

$$a_1 =$$

$$a_{\square} =$$

$$S_{\square} =$$

$$S_{\infty} =$$

輸入

顯示

選擇功能

1. AS 等差數列：1

2. GS 等比數列：2

$$a_{\square} = \square$$

$$a_{\square} = \square$$

$$a_{\square} = ?$$



$$r =$$

$$a_1 =$$

$$a_{\square} =$$

$$S_{\square} =$$

$$S_{\infty} =$$

可能性 1

可能性 2

● 計數機玩法： [Prog B2] Equations of Circles 圓方程

Program B2. [3合] Equations of Circles 圓方程 (199 bytes)	
MODE : 2 (CMPLX)	
CirMemory : ? → A : ? → Y : ? → C : ? → M : If A = i : Then -2Y ▲ -2C ▲ C ² + Y ² - M ² ▲ IfEnd :	43
If A = π : Then arg(Y - M) - arg(C - M) : Y - (1 - j 2) ∠ Ans x (C - Y) / - sin(Ans) ▲ Abs(Y - Ans)	84
▲ IfEnd : If A = e : Then ? → X : ? → B : BCY + 2YM - XC ² → X : ? → A : M ² + AC ² + BCM → A :	132
(√(X ² - 4AC ² - 4AY ²) + X) / (2C ² + 2Y ² → A) ▲ (M - Ans Y) / C → B ▲ X / (C ² + Y ²) - A → X	186
▲ (M - Ans Y) / C → Y ▲ IfEnd	199

功能 1：直出 Dx+Ey+F

輸入

顯示

選擇功能

1. 直出 Dx+Ey+F : i

2. 圓線交點 : e

3. 三點求圓 : π

$x^2 + y^2 + \square x + \square y + \square = 0$

Centre 圓心 = (,)

Radius 半徑 =

功能 2：圓線交點

輸入

選擇功能

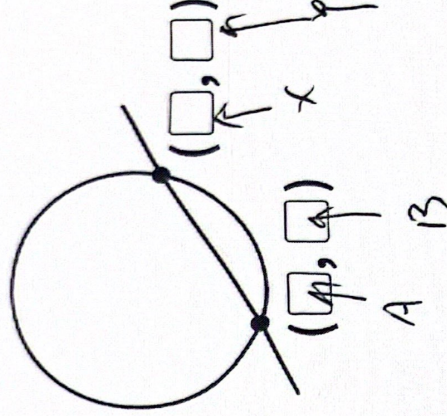
1. 直出 $Dx+Ey+F: i$
2. 圓線交點: **e**
3. 三點求圓: π

直線:

x + y =

圓:

$x^2 + y^2 +$ x + y + = 0



顯示

輸入

選擇功能

1. 直出 $Dx+Ey+F: i$
2. 圓線交點: **e**
3. 三點求圓: **π**

第一點: + i

第二點: + i

第三點: + i

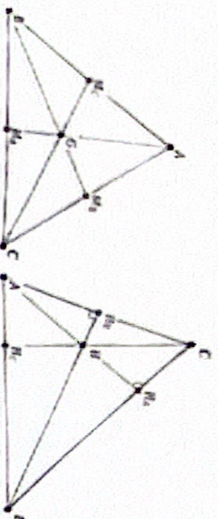


$(x - \square)^2 + (y - \square)^2 = \square^2$

顯示

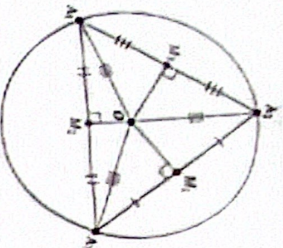
功能 3：三點求圓

◎課本 / 參考書 / 一般補習筆記：



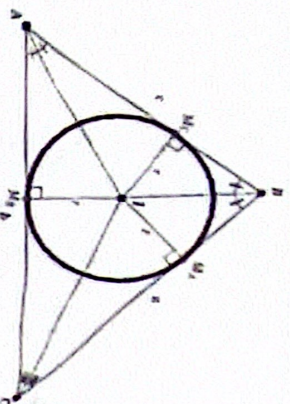
Centroid is the point of intersection of three medians of a triangle. It divides the median internally in ratio 2 : 1.

重心為三角形的三條中線的交點。它將中線以 2 : 1 的比內分。



Orthocentre is the point of intersection of three altitudes of a triangle. 重心為三角形的三條高線的交點。

垂心為三角形的三條高線的交點。



Circumcentre is the point of intersection of three perpendicular bisectors of a triangle. It is equidistant from the three vertices of the triangle. It is also the centre of the circumcircle of the triangle.

外心為三角形的三條垂直平分線的交點。它與三角形的三個頂點等距。它亦為三角形的外接圓的圓心。

In-centre is the point of intersection of three angle bisectors of a triangle. It is equidistant from the three sides of the triangle. It is also the centre of the inscribed circle of the triangle.

內心為三角形的三條角平分線的交點。它與三角形的三邊等距。它亦為三角形的內切圓的圓心。

圖片來源：Wolfram Mathematica

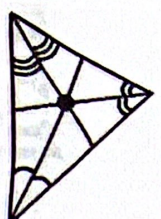
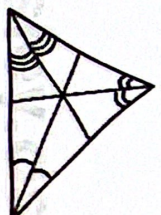
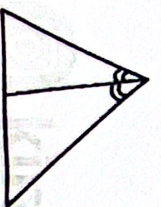
依種教法有咩缺點？

- ☹️ 將大量複雜內容塞入一幅圖，極難消化
- ☹️ 沒有 100% 覆蓋 DSE 所有考點

☹️【考點→】四心の基本概念

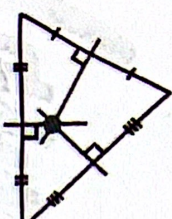
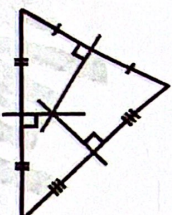
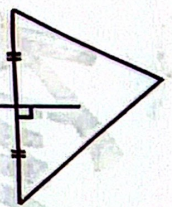
In-centre (內心)

🔪 Angle Bisectors (角平分線) x3



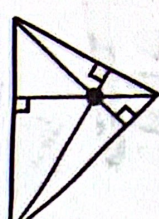
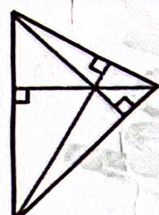
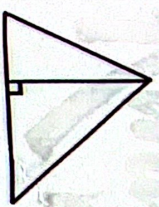
Circumcentre (外心)

🔪 Perpendicular Bisectors (垂直平分線) x3



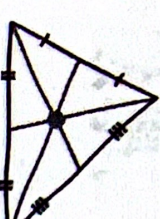
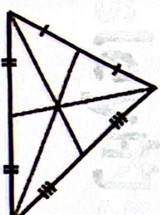
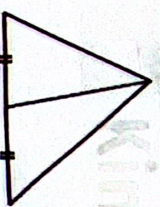
Orthocentre (垂心)

🔪 Altitudes (高線) x3



Centroid (形心)

🔪 Medians (中線) x3



速記方法 (英文版)

Orthocentre
 Altitudes (x3)
 ”痾” ”痾”

Centroid
 Medians (x3)
 send me

In-centre
 Angle Bisectors (x3)
 an in-centre

Circumcentre
 Perpendicular Bisectors (x3)
 最長字 最長字

速記方法 (中文版)

形心
 中線 (x3)

內心
 角平分線 (x3)

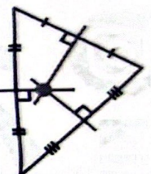
垂心
 高線 (x3)

外心
 垂直平分線 (x3)

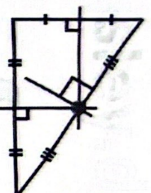
英中 內閣，誰高 愛誰

📍 **【考點二】四心の位置**

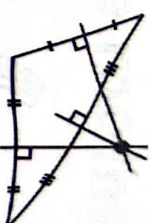
Circumcentre (外心)
Perpendicular Bisectors
(垂直平分線) x3



入面

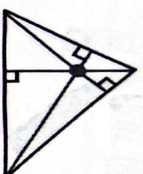


斜邊中間

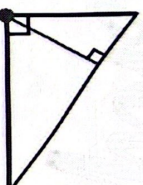


外面 [近最長邊]

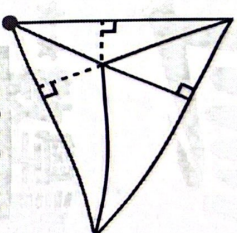
Orthocentre (垂心)
Altitudes (高線) x3



入面

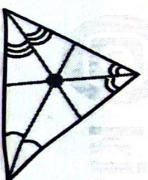


直角頂點



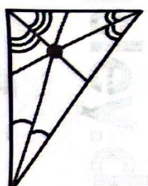
外面 [近最大角]

**Acute-angled Triangle
(銳角三角形)**



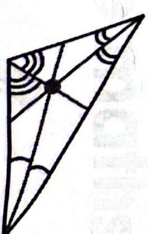
入面

**Right-angled Triangle
(直角三角形)**



入面

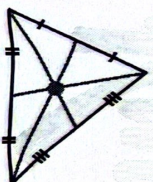
**Obtuse-angled Triangle
(鈍角三角形)**



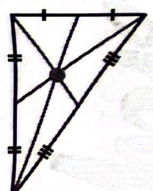
入面

In-centre (內心)
Angle Bisectors (角平分線) x3

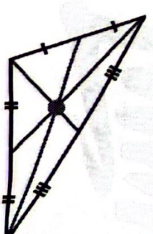
Centroid (形心)
Medians (中線) x3



入面



入面

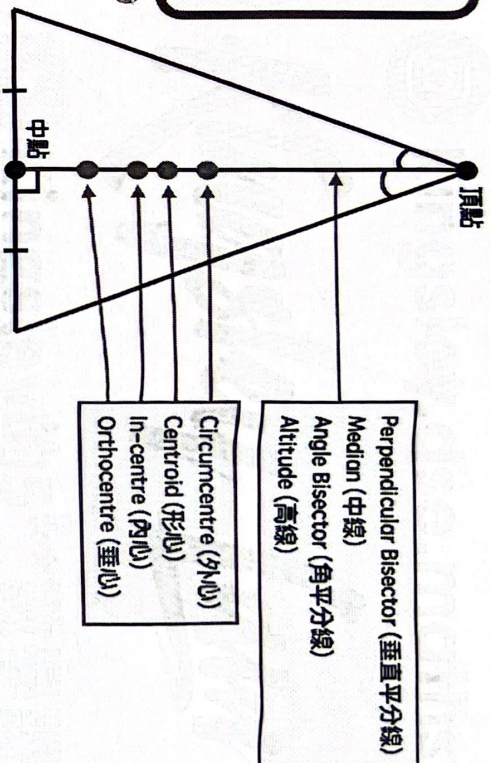


入面

【考點三】四心の特殊情況

特殊情況 1
Isosceles Triangle
(等腰三角形)

考試出現機會：🌐🌐🌐🌐

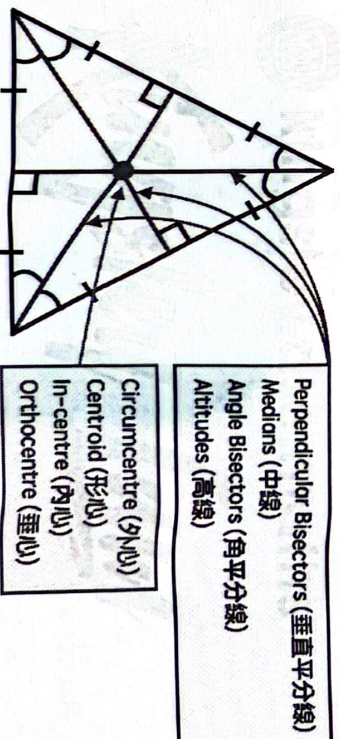


💡 四心連成一線 / *Collinear (共線)*

【考點三】四心の特殊情況

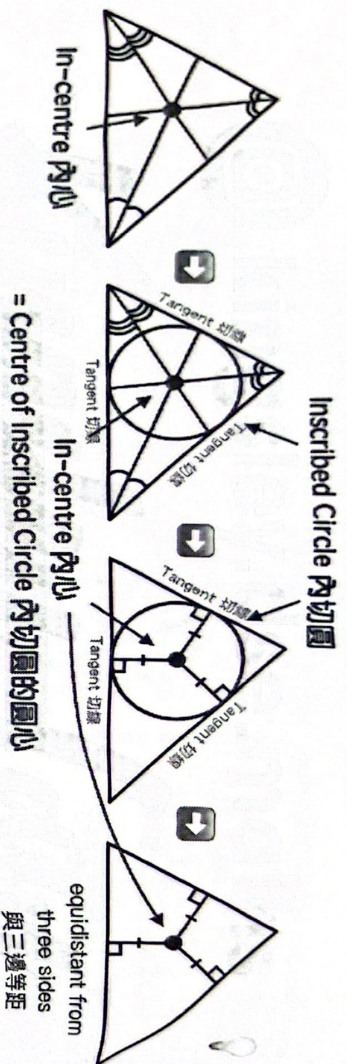
特殊情況 2
Equilateral Triangle
(等邊三角形)

考試出現機會：🌐



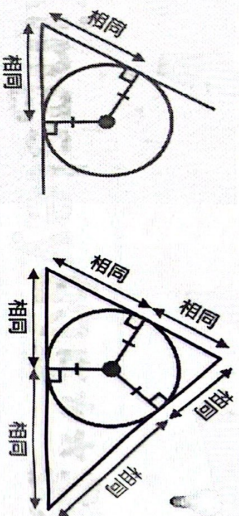
💡 四心在同一位置

【考點四】In-centre (內心) の性質

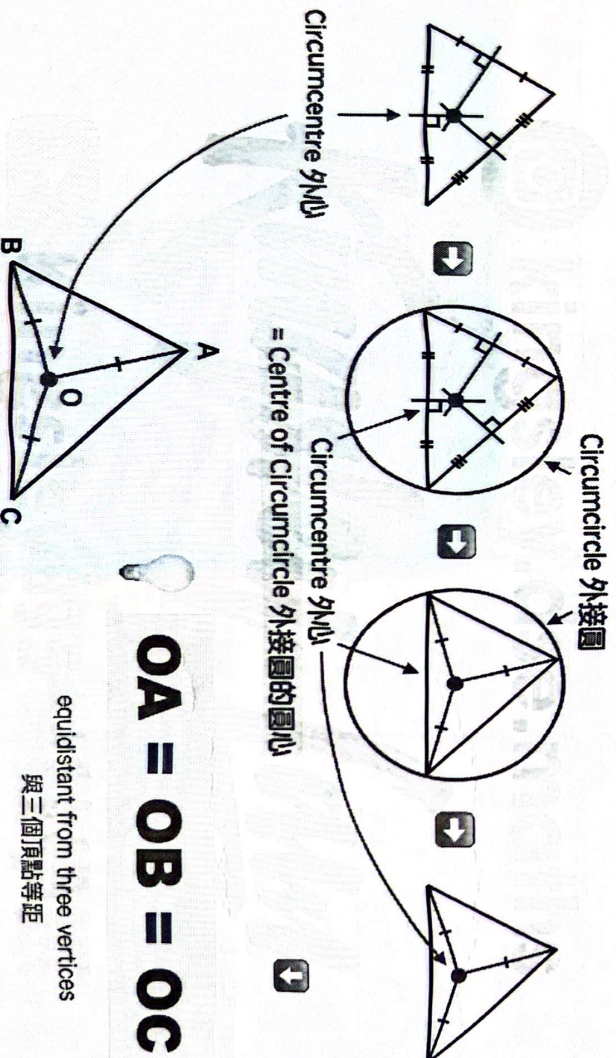


記憶召喚

Tangent Properties
切線性質



【考點五】Circumcentre (外心) の性質

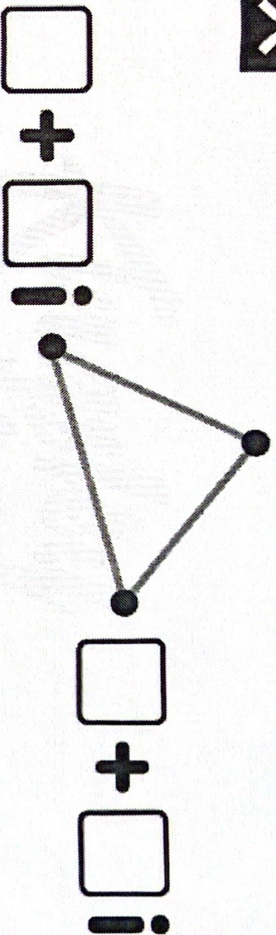


● 計數機玩法：【Prog B4】Four Centres 四心

Program B4, Four Centres 四心 (93 bytes)	
MODE : 2 (CMPLX)	
ClrMemory : ? → A : ? → B : ? → C : A + B + C → M : B - C → X : A - B → Y : M ∟ 3 ▲ X ∟ (A - C	44
→ D : C - i Y tan(arg(i D M - ▲ M ∟ 2 ▲ Abs(X) + Abs(A - C) - Abs(Y : Ans - i Ans tan(.5 arg(82
D : C + Ans (.5 ∟ arg(X	93

輸入

$$\square + \square i$$



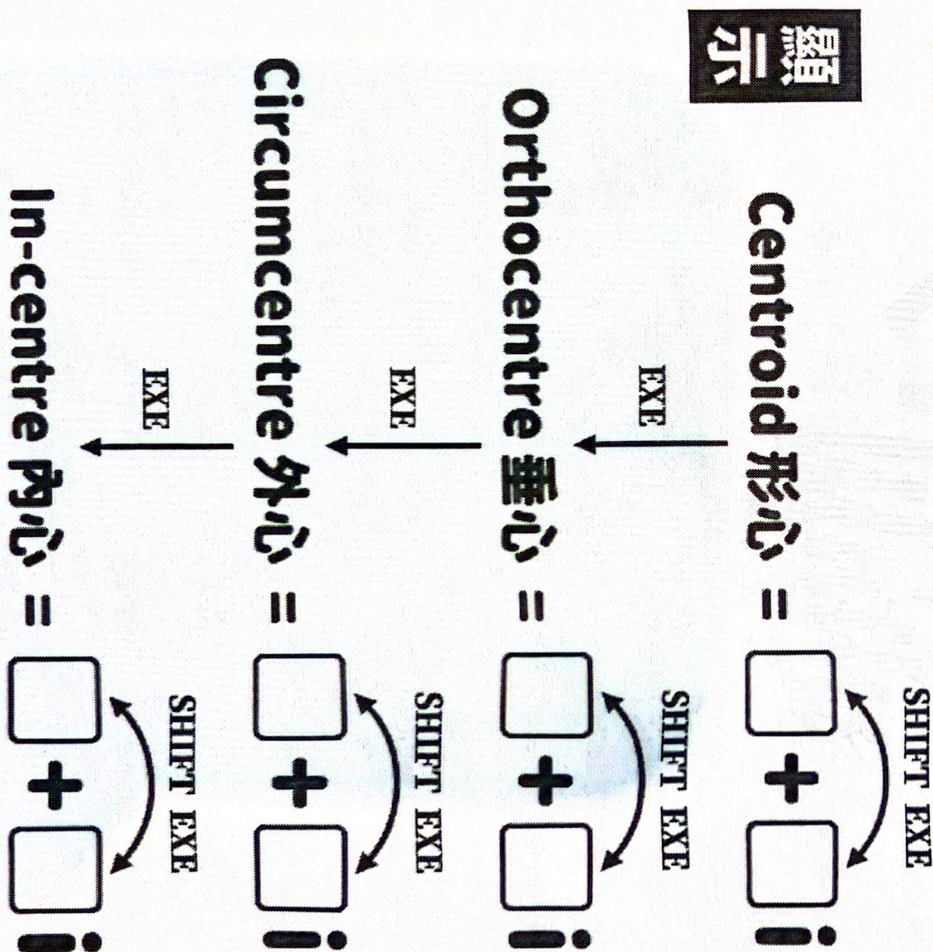
顯示

Centroid 形心 = $\square + \square i$

Orthocentre 垂心 = $\square + \square i$

Circumcentre 外心 = $\square + \square i$

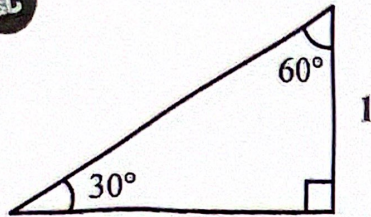
In-centre 內心 = $\square + \square i$



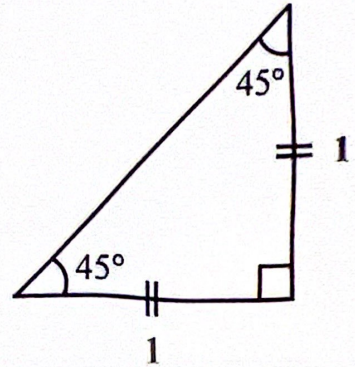
● 隱藏關鍵：最特別の直角三角形

👍 用途：一眼睇穿邊長比例 !!!

記



記

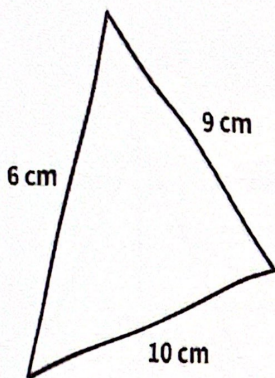


● 計數機玩法：【Prog B3】 Trigonometry 三角

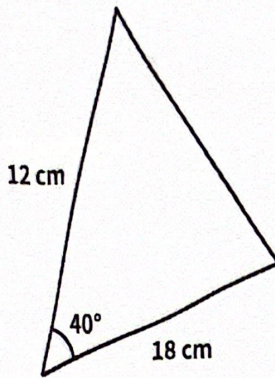
Program B3. [5合] Trigonometry 三角 (200 bytes)	
MODE: 1 (COMP)	
ClrMemory : While 1 : ? → A : ? → B : ? → C : AB < 0 ⇒ Goto 0 : B → X : - sin(C) ↓ sin(A → B :	39
A < 0 ⇒ cos ⁻¹ ((A ² + X ² - C ²) ↓ (2AX → B : X → C : Lbl 0 : C < 0 → D : Abs(A ▲ Abs(B ▲ A < 0 ⇒	85
Break : D ⇒ 180 - A - sin ⁻¹ (BC ⁻¹ sin(A → C : C ▲ Pol(B tan(90 - A - C , -B) sin(A ▲ Y ▲ X sin(126
C ▲ -.5B Ans sin(A ▲ DY - A → C : Ans > 0 ⇒ Goto 0 : WhileEnd : cos ⁻¹ (D ⇒ A sin(B + C) ↓ sin(163
C → C : -C ▲ Pol (Ans + A cos(B , -A sin(B : Y ▲ X ▲ 180 - B - Y ▲ .5AC sin(B	200

● 計數機玩法：【Prog B3】 Trigonometry 三角

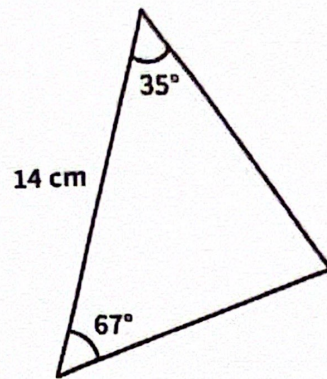
3 大原則 ① 最短路线 ② 先近后远 ③ 边长 = 负数



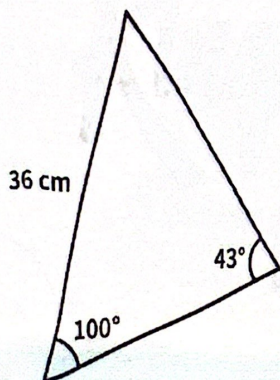
Area 面積 = _____



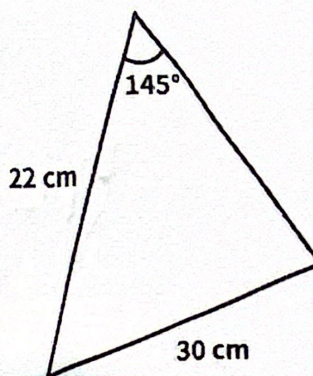
Area 面積 = _____



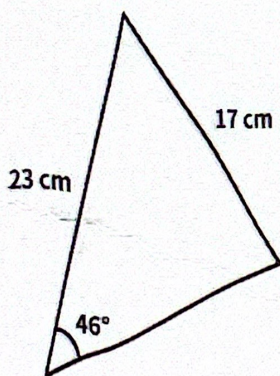
Area 面積 = _____



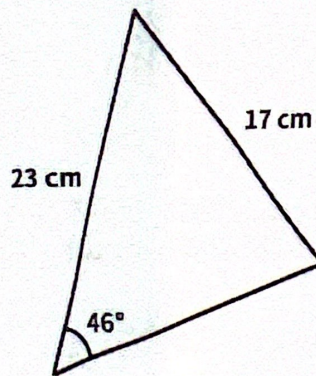
Area 面積 = _____



Area 面積 = _____



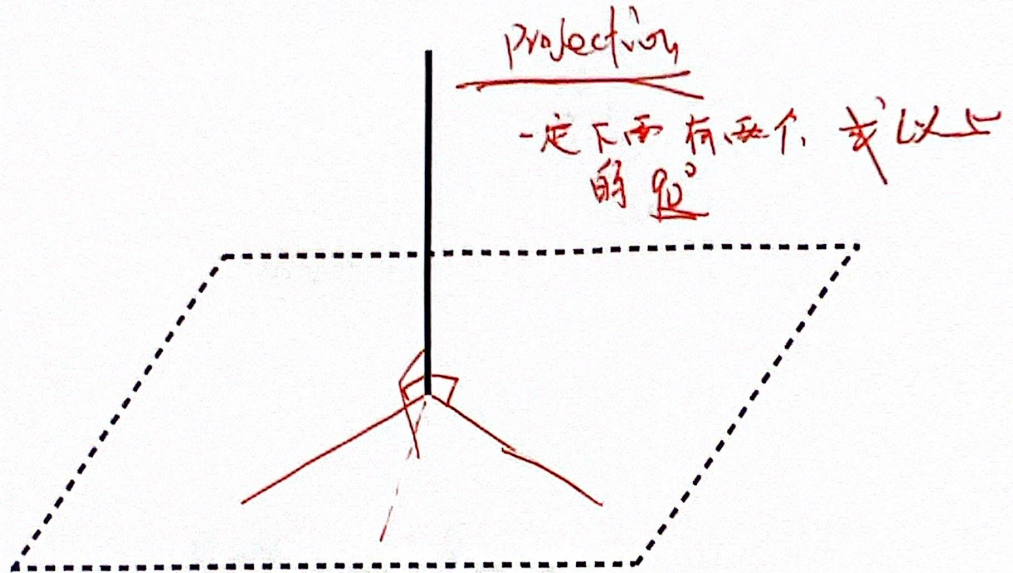
Area 面積 = _____



Area 面積 = _____

● 必讀考點：

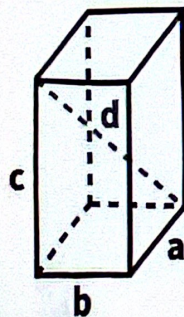
Vertical (鉛垂) / Perpendicular to Plane (垂直於平面) / Height (高)



● 5**招式：立體畢氏定理

📦 立體畢氏定理

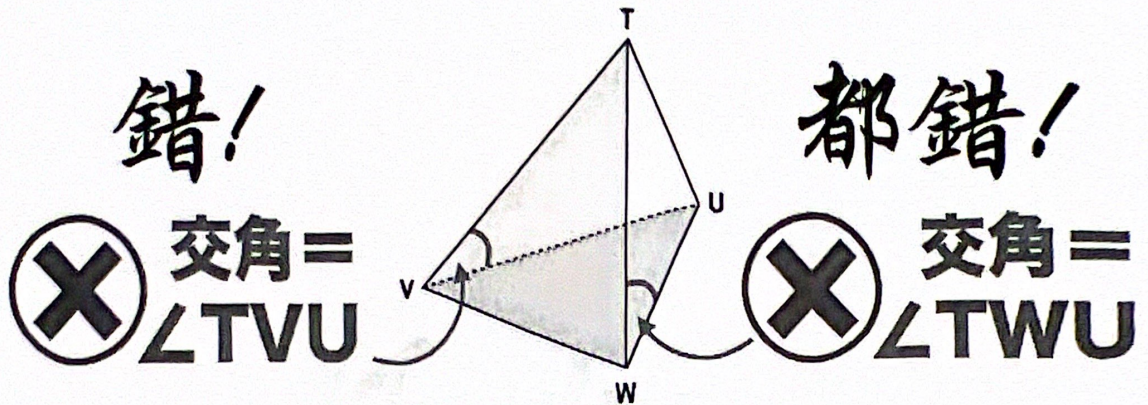
來源：<https://www.mathsisfun.com/geometry/pythagoras-3d.html>



$$d = \sqrt{a^2 + b^2 + c^2}$$

Angle between Two Planes 兩平面的交角【兩面交角】

In the figure, $\triangle TVW \cong \triangle UVW$. Find the angle between the plane TVW and the plane UVW.
圖中， $\triangle TVW \cong \triangle UVW$ 。求平面 TVW 與平面 UVW 間的交角。

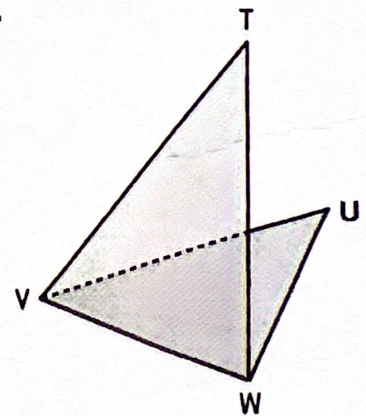


♥ 入腦秘笈：爬山故事【兩面交角】

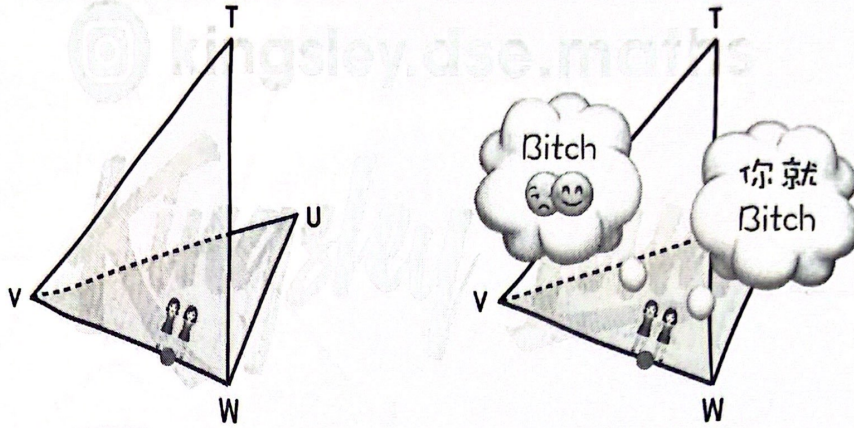
(In the figure, $\triangle TVW \cong \triangle UVW$.) Find the angle between the plane TVW and the plane UVW.
(圖中， $\triangle TVW \cong \triangle UVW$ 。)求平面 TVW 與平面 UVW 間的交角。

- ▲ 平面 TVW = 山
- ▲ 平面 UVW = 山
- *相交線 VW = 山腳

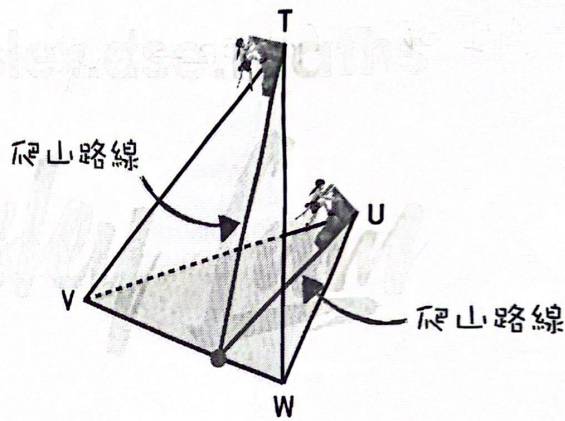
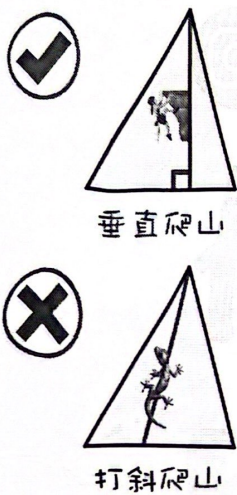
步驟 1：找出山、山、山腳



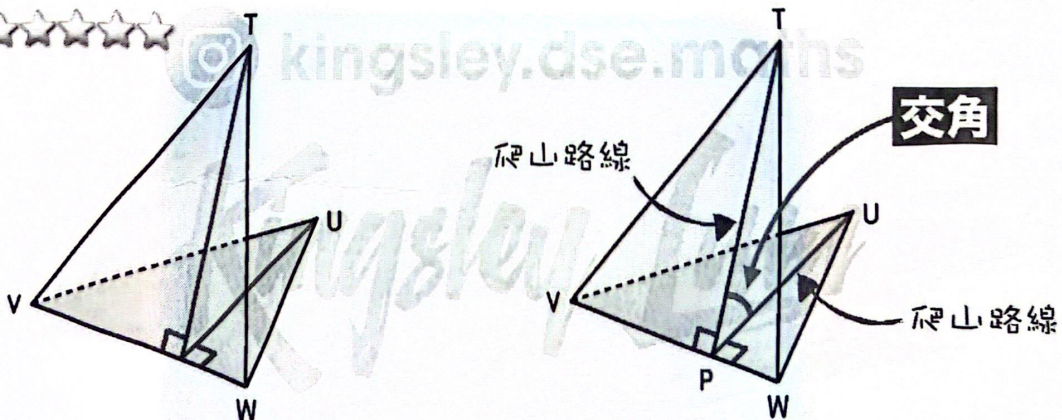
(In the figure, $\triangle TVW \cong \triangle UVW$.) Find the angle between the plane TVW and the plane UVW.
 (圖中, $\triangle TVW \cong \triangle UVW$ 。) 求平面 TVW 與平面 UVW 間的交角。



步驟 2 : 兩人在山腳相遇 → 忽然吵架 → 決定分開爬山



步驟 3 : 各自爬一座山 (幫兩人畫出爬山路線)

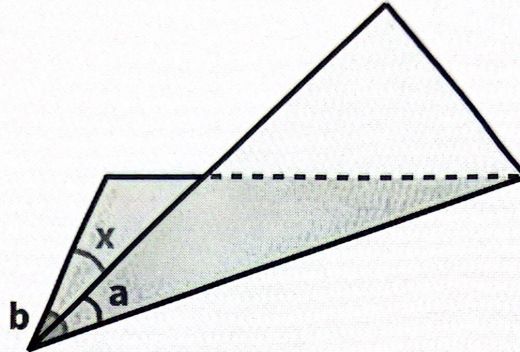


步驟 4 : 畫直角(x2) **步驟 5** : 爬山路線之間 = 交角

👑 交角定理

Dihedral Angle Formula
二面角公式

来源：https://en.wikipedia.org/wiki/Dihedral_angle#Geometry



Let (設) 交角 = θ

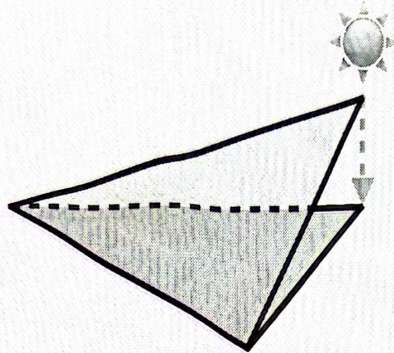
$$\cos \theta = \frac{\cos x - \cos a \cdot \cos b}{\sin a \cdot \sin b}$$

● 5** 招式：影の定理

☀ 影の定理

Area Projection Theorem
面積投影定理

來源：HKCEE A.Maths 2003 - Q18

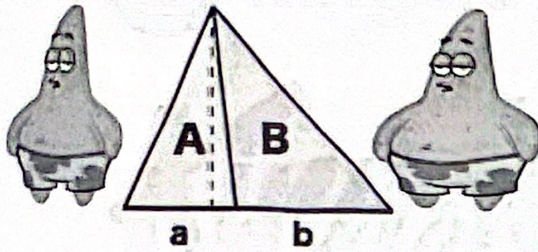


Let (設) 交角 = θ

$$\cos \theta = \frac{\text{影子面積}}{\text{斜面面積}}$$

● 隱藏關鍵：Ratio of Area (面積比)

🔑 隱藏關鍵 (一)



same height (同高)

Ratio of base (底比) = Ratio of AREA (面積比)

$$a : b = A : B$$

底比 $\frac{a}{b} = \frac{A}{B}$ 面積比

🔑 隱藏關鍵 (二)

