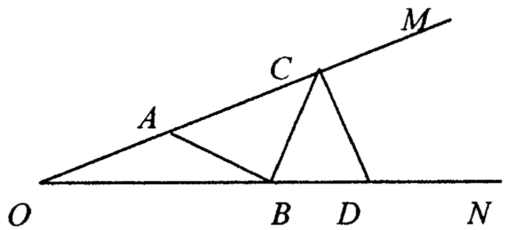
1999 HG9

如圖，$\angle MON = 20°$，A 為 OM 上的一點，$OA = 4\sqrt{3}$，D 為 ON 上的一點，$OD = 8\sqrt{3}$，C 為 AM 上的任意一點，B 為 OD 上的任意一點。



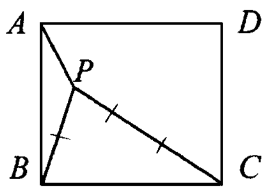
若 $\ell = AB + BC + CD$，求 ℓ 的最小值。

In the figure, $\angle MON = 20°$, A is a point on OM, $OA = 4\sqrt{3}$, D is a point on ON, $OD = 8\sqrt{3}$, C is any point on AM, B is any point OD.

If $\ell = AB + BC + CD$, find the least value of ℓ.

1999 HG10

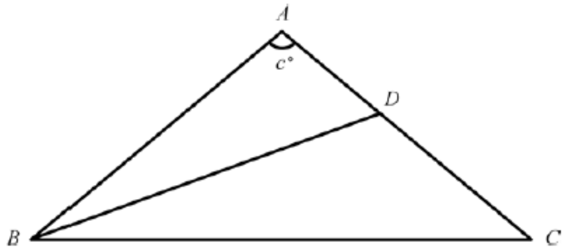
如圖，P 為正方形 $ABCD$ 內一點，$PA = a$，$PB = 2a$，$PC = 3a$ $(a > 0)$。若 $\angle APB = x°$，求 x 的值。



In the figure, P is a point inside the square $ABCD$, $PA = a$, $PB = 2a$, $PC=3a$ $(a > 0)$. If $\angle APB = x°$, find the value of x.

2003 FG1.3

如圖，ΔABC 是一個等腰三角形，其中 $AB = AC$。若 $\angle B$ 的角平分綫交 AC 於 D 且 $BC = BD + AD$。設 $\angle A = c°$，求 c 的值。



In the figure, ΔABC is an isosceles triangle and $AB = AC$.

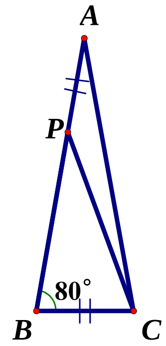
Suppose the angle bisector of $\angle B$ meets AC at D and $BC = BD + AD$.

Let $\angle A = c°$, find the value of c.

2004 HG9

在圖中，ΔABC 是等腰三角形，$AB = AC$ 及 $\angle ABC = 80°$。若 P 是 AB 上一點使得 $AP = BC$，$\angle ACP = k°$，求 k 的值。

In the figure, ΔABC is an isosceles triangle with $AB = AC$ and $\angle ABC = 80°$. If P is a point on the AB such that $AP = BC$, $\angle ACP = k°$, find the value of k.

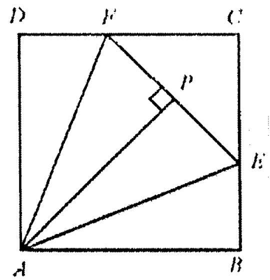


2006 HG7

如圖，正方形 $ABCD$ 的周界是 16 cm，$\angle EAF = 45°$，$AP \perp EF$。若 AP 的長度是 R m，求 R 的值。

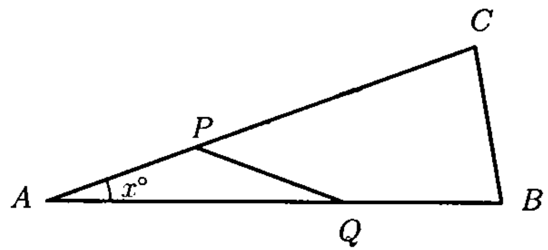
In the figure, $ABCD$ is a square with perimeter equal to 16 cm, $\angle EAF = 45°$ and $AP \perp EF$.

If the length of AP is equal to R cm, find the value of R.



2010 HG10

在圖中，ΔABC 滿足 $AB = AC$ 且 $x \le 45$。若 P 和 Q 分別是 AC 及 AB 上的兩點，且 $AP = PQ = QB = BC \le AQ$，求 x 的值。



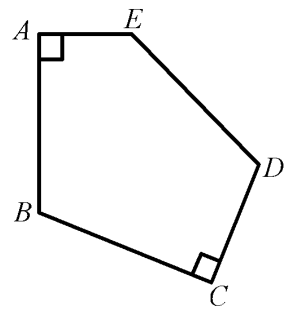
In the figure, in ΔABC, $AB = AC$, $x \le 45$. If P and Q are two points on AC and AB respectively, and $AP = PQ = QB = BC \le AQ$, find the value of x.

2013 HI9

圖中所示為五邊形 $ABCDE$。$AB = BC = DE = AE + CD = 3$，且 $\angle A = \angle C = 90°$，求該五邊形的面積。

The figure shows a pentagon $ABCDE$.

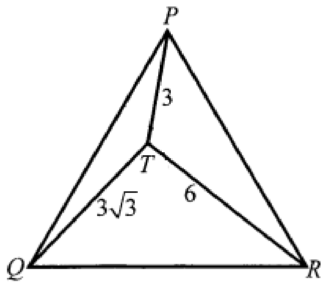
$AB = BC = DE = AE + CD = 3$ and $\angle A = \angle C = 90°$, find the area of the pentagon.



2014 HI3

如圖所示，T 為等邊三角形 PQR 內一點，其中 $TP=3$、$TQ=3\sqrt{3}$ 及 $TR=6$。求 $\angle PTR$ 的值。

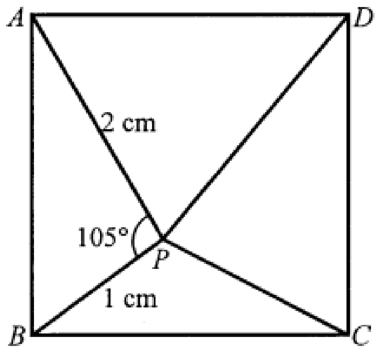
As shown in the figure, a point T lies in an equilateral triangle PQR such that $TP = 3$, $TQ = 3\sqrt{3}$ and $TR = 6$. Find the value of $\angle PTR$.



2014 HG4

如圖二所示，$ABCD$ 為一正方形。P 為 $ABCD$ 內的一點使得 $AP = 2$ cm、$BP = 1$ cm 及 $\angle APB = 105°$。若 $CP^2 + DP^2 = x$ cm^2，求 x 的值。

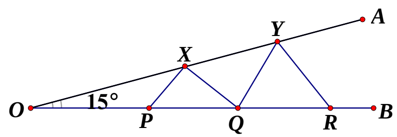
As shown in Figure 2, $ABCD$ is a square. P is a point lies in $ABCD$ such that $AP = 2$ cm, $BP = 1$ cm and $\angle APB = 105°$.
If $CP^2 + DP^2 = x$ cm^2, find the value of x .



2016 HG5

圖中，$\angle AOB = 15°$。X、Y 是 OA 上的點，P、Q、R 是 OB 上的點使得 $OP = 1$ 及 $OR = 3$。若 $s = PX + XQ + QY + YR$，求 s 的最小值。

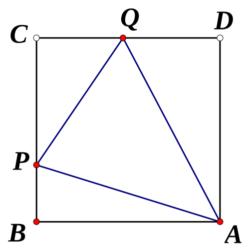
In the figure, $\angle AOB = 15°$. X, Y are points on OA, P, Q, R are points on OB such that $OP = 1$ and $OR = 3$. If $s = PX + XQ + QY + YR$, find the least value of s.



2017 HG3

如圖所示，P、Q 分別是正方形 $ABCD$ 的邊 BC 及 CD 上的點。已知 ΔPCQ 的周界的長等於正方形 $ABCD$ 的周界的長的 $\frac{1}{2}$，求 $\angle PAQ$ 的值。

As shown in the figure, P, Q are points on the sides BC and CD of a square $ABCD$. Given that the perimeter of ΔPCQ is $\frac{1}{2}$ of that of the square $ABCD$, find the value of $\angle PAQ$.



2019 HG10

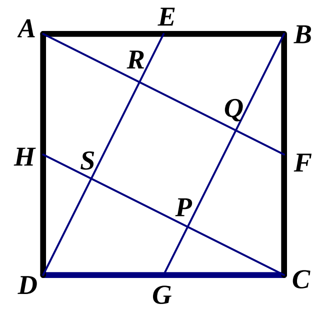
D 是等邊三角形 ABC 內的一點使得 $AD = BD = 5\sqrt{2}$ 及 $CD = 10$。

設 ΔABC 的面積為 S，求 S 的值。

D is a point inside the equilateral triangle ABC such that $AD = BD = 5\sqrt{2}$ and $CD = 10$. Let the area of ΔABC be S, find the value of S .

2019 FG2.4

在正方形 $ABCD$ 中，E、F、G 和 H 分別是 AB、BC、CD 和 AD 的中點。DE 分別與 AF 和 CH 相交於點 R 和 S。BG 分別與 AF 和 CH 相交於點 Q 和 P。若 U 是正方形 $ABCD$ 的面積，而 V 是四邊形 $PQRS$ 的面積，求 $W = \frac{U}{V}$ 的值。



In square $ABCD$, E, F, G, H are the mid-points of AB, BC, CD and AD respectively. DE intersects with AF and CH at R and S respectively. Moreover, BG intersects with AF and CH at Q and P respectively. If U is the area of square $ABCD$ and V is the area of the quadrilateral $PQRS$, determine the value of $W = \frac{U}{V}$.

2023 HI14

ABC 是一個等腰三角形，其中 $AB = AC = 18$ 及 $BC = 12$。P 為 ΔABC 內的任意一點使得 $\angle ABP + \angle ACP = 90°$ 及 $AP = 15$。求 $BP^2 + CP^2$ 的值。

ABC is an isosceles triangle with $AB = AC = 18$ and $BC = 12$.

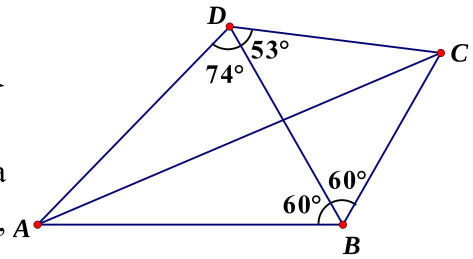
P is any interior point of ΔABC such that $\angle ABP + \angle ACP = 90°$ and $AP = 15$.

Find the value of $BP^2 + CP^2$.

2024 HI8

如圖二所示，$ABCD$ 是一個四邊形。若$\angle ABD = \angle CBD = 60°$，$\angle ADB = 74°$及$\angle CDB = 53°$，求$\angle BAC$ 的值。

As shown in Figure 2, $ABCD$ is a quadrilateral. If $\angle ABD = \angle CBD = 60°$, $\angle ADB = 74°$ and $\angle CDB = 53°$, find the value of $\angle BAC$.



圖二 Figure 2

Answers

1999 HG9 12	1999 HG10 135	2003 FG1.3 100	2004 HG9 10	2006 HG7 4
2010 HG10 20	2013 HI9 9	2014 HI3 120°	2014 HG4 $15-4\sqrt{2}$	2016 HG5 $\sqrt{7}$
2017 HG3 45°	2019 HG10 $25\sqrt{3}+37.5$	2019 FG2.4 5	2023 HI14 100	2024 HI8 23°