

**1983 FI4.4**

把一 3 cm 的鐵綫屈曲成一半徑為 1 cm 的扇形。問扇形的圓心角為何？

A wire of 3 cm is bent to form a sector of radius 1 cm .

What is the angle of the sector in degrees (correct to the nearest degree)?

**1986 FI1.1**

附圖所示的圓之半徑為 18 cm，圓心為  $O$ 。

若  $\angle AOB = \frac{\pi}{3}$ ，且弧  $APB$  之長為  $a\pi$  cm，求  $a$  的值。

The given figure shows a circle of radius 18 cm, centre  $O$ .

If  $\angle AOB = \frac{\pi}{3}$  and the length of arc  $APB$  is  $a\pi$  cm,

find the value of  $a$ .

**1988 FI3.2**

附圖所示圓形的半徑是  $2h$  cm，圓心是  $O$ 。

若  $\angle AOB = \frac{\pi}{3}$ ，且扇形  $AOBP$  的面積是  $k\pi$  cm<sup>2</sup>，求  $k$  的值。

The given figure shows a circle of radius 6 cm, centre  $O$ .

If  $\angle AOB = \frac{\pi}{3}$ , and the area of sector  $AOBP$  is  $k\pi$  cm<sup>2</sup>,

find the value of  $k$ .

**1990 HI18**

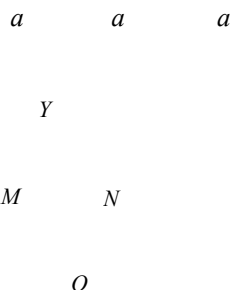
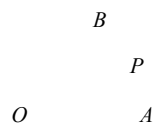
如圖，三個半圓的直徑分別為  $a$ 、 $2a$  及  $3a$ 。求陰影部分的面積與沒有陰影部分的面積的比值。

The figure shows 3 semi-circles of diameters  $a$ ,  $2a$  and  $3a$  respectively. Find the ratio of the area of the shaded part to that of the unshaded part.

**1994 HI9**

如圖， $XY = 3$ 、 $YZ = 4$  及  $ZX = 5$ 。現以  $M$ 、 $N$ 、 $O$  為圓心作半圓，其中  $M$ 、 $N$ 、 $O$  分別為  $XY$ 、 $YZ$ 、 $ZX$  的中點。試求陰影部分面積之和。

In the figure,  $XY = 3$ ,  $YZ = 4$  and  $ZX = 5$ . Semi-circles are constructed with  $M$ ,  $N$ ,  $O$  as centres as shown where  $M$ ,  $N$ ,  $O$  are mid-points of  $XY$ ,  $YZ$  and  $ZX$  respectively. Find the sum of the shaded areas.

**1998 HG8**

在圖中，四個半徑為 1 的圓緊緊地放在一個正方形內。

求陰影部分的面積。(答案準確至最接近之整數)。

In the figure, four circles with radius 1 touch each other inside a square. Find the shaded area.

(Correct your answer to the nearest integer.)

**1998 FG1.1**

若扇形面積  $s = 4$  cm<sup>2</sup>、扇形半徑  $r = 2$  cm 及扇形的弧長  $A = p$  cm，求  $p$  的數值。

If the area of a given sector  $s = 4$  cm<sup>2</sup>, the radius of this sector  $r = 2$  cm and the arc length of this sector  $A = p$  cm, find the value of  $p$ .

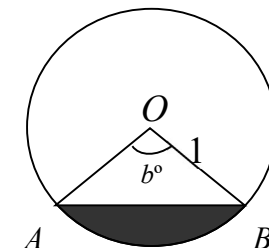
**1998 FG4.2**

圖中的圓之圓心為  $O$ ，半徑為 1， $A$  和  $B$  是圓形上的點。已知  $\frac{\text{陰影部分}}{\text{沒有陰影部分}} = \frac{\pi - 2}{3\pi + 2}$  且  $\angle AOB = b^\circ$ ，

求  $b$  的數值。

The circle in the figure has centre  $O$  and radius 1,  $A$  and  $B$  are points on the circle. Given that

$\frac{\text{Area of shaded part}}{\text{Area of unshaded part}} = \frac{\pi - 2}{3\pi + 2}$  and  $\angle AOB = b^\circ$ , find the value of  $b$ .

**1999 HI1**

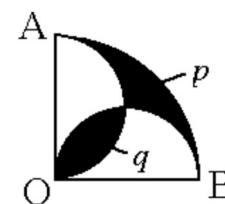
有一圓，其圓周是  $14\pi$  cm。若一弧所對的圓心角是  $\frac{1}{7}$  個弧度，設這弧的長度是  $X$  cm，求  $X$  的數值。

The circumference of a circle is  $14\pi$  cm. Let  $X$  cm be the length of an arc of the circle, which subtends an angle of  $\frac{1}{7}$  radian at the centre. Find the value of  $X$ .

**1999 FI2.3**

在圖中， $OAB$  為四分之一圓，且以  $OA$ 、 $OB$  為直徑繪出兩個半圓，若  $p$ 、 $q$  代表陰影部分之面積，其中  $p = 1$  cm<sup>2</sup> 及  $q = c$  cm<sup>2</sup>，求  $c$  之值。

In the figure,  $OAB$  is a quadrant of a circle and semi-circles are drawn on  $OA$  and  $OB$ . If  $p$ ,  $q$  denotes the areas of the shaded regions, where  $p = 1$  cm<sup>2</sup> and  $q = c$  cm<sup>2</sup>, find the value of  $c$ .



**2000 FG4.2**

在圖中， $ABCD$  為長方形， $AB = \sqrt{\frac{8 + \sqrt{64 - \pi^2}}{\pi}}$ ，

$BC = \sqrt{\frac{8 - \sqrt{64 - \pi^2}}{\pi}}$ 。  $BE$ 、 $BF$  分別是以  $C$ 、 $A$  為圓心的弧。若  $b$  是陰影部份之面積，求  $b$  的值。

In Figure 4,  $ABCD$  is a rectangle with

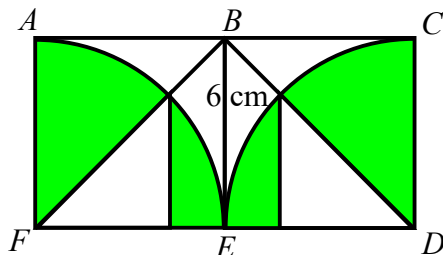
$AB = \sqrt{\frac{8 + \sqrt{64 - \pi^2}}{\pi}}$  and  $BC = \sqrt{\frac{8 - \sqrt{64 - \pi^2}}{\pi}}$ .  $BE$  and  $BF$  are the arcs of circles with centres at  $C$  and  $A$  respectively.

If  $b$  is the total area of the shaded parts, find the value of  $b$ .

**2001 HI10**

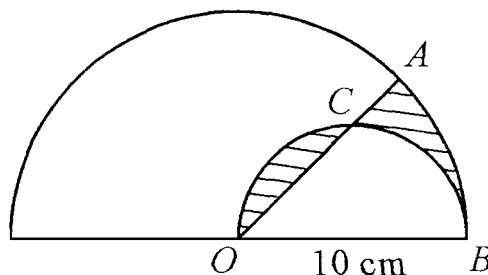
如圖， $ABEF$ 、 $BCDE$  為正方形， $BE = 6$  cm， $\widehat{AE}$  及  $\widehat{CE}$  是分別以  $F$ 、 $D$  為圓心畫出來的弧。如果圖中陰影部分的總面積為  $S$  cm<sup>2</sup>，求  $S$  的數值。(取  $\pi = 3$ )

In the figure,  $ABEF$ ,  $BCDE$  are two squares,  $BE = 6$  cm, and  $\widehat{AE}$  and  $\widehat{CE}$  are the arcs drawn with centres  $F$  and  $D$  respectively. If the total area of the shaded parts is  $S$  cm<sup>2</sup>, find the value of  $S$ . (Assume  $\pi = 3$ .)

**2004 HI6**

在圖中，大半圓的圓心是  $O$ ，半徑是 10 cm， $OB$  是小半圓的直徑， $C$  是弧  $OB$  的中點且在線段  $OA$  上。設陰影部分的面積是  $K$  cm<sup>2</sup>，求  $K$  的值。(取  $\pi = 3$ )

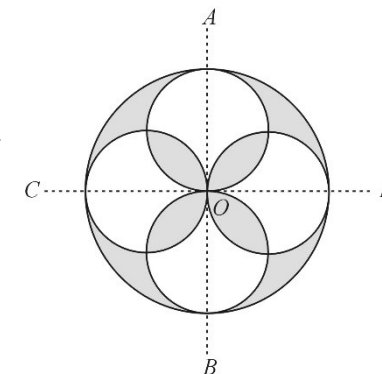
In the figure,  $O$  is the centre of the bigger semicircle with radius 10 cm,  $OB$  is the diameter of the smaller semicircle and  $C$  is the midpoint of arc  $OB$  and it lies on the segment  $OA$ . Let the area of the shaded region be  $K$  cm<sup>2</sup>, find the value of  $K$ . (Take  $\pi = 3$ )

**2005 HI8**

如圖， $AB$  垂直於  $CD$ ，其交點  $O$  是大圓的圓心，而四個小圓的圓心分別在  $AB$  和  $CD$  上。已知大圓的半徑是 1 cm，四個小圓的半徑是  $\frac{1}{2}$  cm。

若陰影部分的面積是  $R$  cm<sup>2</sup>，求  $R$  的值。(取  $\pi = 3$ )

In the figure,  $AB$  is perpendicular to  $CD$ , their intersection point  $O$  is the centre of the large circle and the centres of the four circles lies on either  $AB$  or  $CD$ . Given also that the radius of the large circle is 1 cm and the radius of each of the four small circles is  $\frac{1}{2}$  cm.

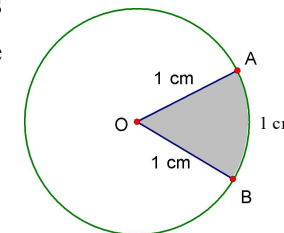


If the area of the shaded region is  $R$  cm<sup>2</sup>, find the value of  $R$ . (take  $\pi = 3$ )

**2006 FI1.2**

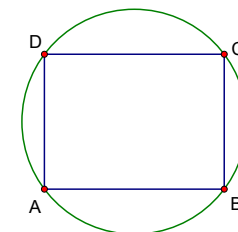
如圖， $O$  是半徑 1 cm 的圓的圓心。若弧  $AB$  的長度是 1 cm 及著色部份扇形  $OAB$  的面積是  $b$  cm<sup>2</sup>，求  $b$  的值。(取  $\pi = 3$ )

In the figure,  $O$  is the centre of the circle with radius 1 cm. If the length of the arc  $AB$  is equal to 1 cm and the area of the shaded sector  $OAB$  is equal to  $b$  cm<sup>2</sup>, find the value of  $b$ . (Take  $\pi = 3$ )

**2006 FI3.2**

如圖， $ABCD$  是圓內長方形， $AB = 8$  cm 及  $AD = 6$  cm。若圓形的圓周是  $R$  cm，求  $R$  的值。(取  $\pi = 3$ )

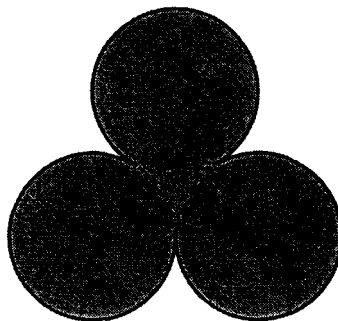
In the figure,  $ABCD$  is an inscribed rectangle,  $AB = 8$  cm and  $AD = 6$  cm. If the circumference of the circle is  $R$  cm, find the value of  $R$ . (Take  $\pi = 3$ )



**2008 FI3.3**

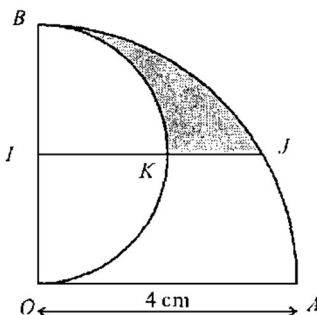
右圖由三個大小相同互切的圓所組成，三個圓的半徑均是3 cm。若陰影部分的周界是  $C$  cm，求  $C$  的值。(取  $\pi = 3$ )

The figure is formed by three identical circles touching one another, the radius of each circle is 3 cm. If the perimeter of the shaded region is  $C$  cm, find the value of  $C$ . (Take  $\pi = 3$ )

**2009 FG3.4**

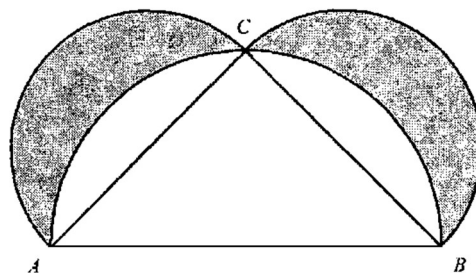
如圖，扇形  $OAB$  的半徑為 4 cm 及  $\angle AOB$  為直角。設以  $OB$  為直徑的半圓，其圓心為  $I$  且  $IJ \parallel OA$  及  $IJ$  與該半圓相交於  $K$ 。若陰影部分的面積為  $T$   $\text{cm}^2$ ，求  $T$  的值。(取  $\pi = 3$ )

In Figure 2, the sector  $OAB$  has radius 4 cm and  $\angle AOB$  is a right angle. Let the semi-circle with diameter  $OB$  be centred at  $I$  with  $IJ \parallel OA$ , and  $IJ$  intersects the semi-circle at  $K$ . If the area of the shaded region is  $T$   $\text{cm}^2$ , find the value of  $T$ . ( $\pi = 3$ )

**2009 FG4.2**

如圖，設  $AB$ 、 $AC$  及  $BC$  為相應半圓的直徑。若  $AC = BC = 1$  cm 及陰影部分的面積是  $R$   $\text{cm}^2$ ，求  $R$  的值。

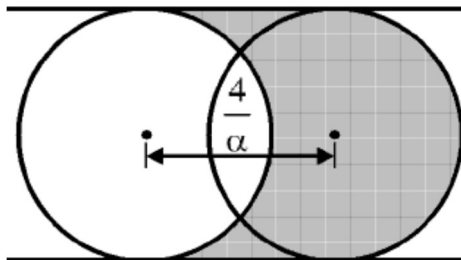
In the figure, let  $AB$ ,  $AC$  and  $BC$  be the diameters of the corresponding three semi-circles. If  $AC = BC = 1$  cm and the area of the shaded region is  $R$   $\text{cm}^2$ . Find the value of  $R$ .

**2014 FI2.2**

右圖為兩個半徑為 4 的圓，其圓心相隔 3。求陰影部分的面積  $\beta$ 。

In the figure, two circles of radii 4 with their centres placed apart by 3.

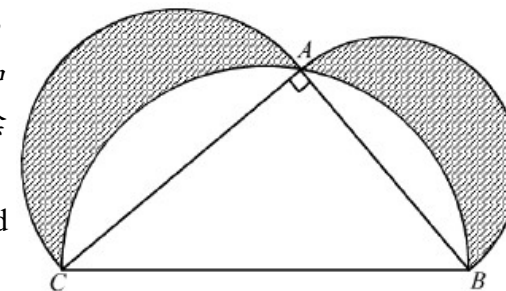
Determine the area  $\beta$ , of the shaded region.

**2019FG4.1**

如圖所示， $\triangle ABC$  是一直角三角形，其中  $AC = 8$ ， $BC = 10$ 。以  $AB$ 、 $AC$  和  $BC$  為直徑分別畫了三個半圓。若陰影部分的總面積是  $\alpha$ ，求  $\alpha$  的值。

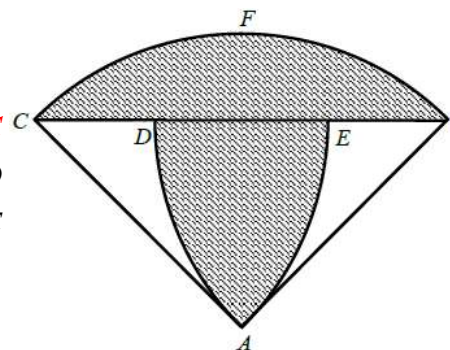
In the figure,  $\triangle ABC$  is a right-angled triangle with  $AC = 8$  and  $BC = 10$ .

Semi-circles are drawn with  $AB$ ,  $AC$  and  $BC$  as diameters. If the total shaded area is  $\alpha$ , determine the value of  $\alpha$ .

**2023 FG1.3**

右圖中， $ABC$  是一個等腰三角形，其中  $\angle A = 90^\circ$  及  $AB = 2$ 。圖中有三個弧，它們分別是弧  $BFC$ 、弧  $AD$  和弧  $AE$ 。弧  $BFC$  是以  $A$  為圓心、 $AB$  為半徑畫出的。弧  $AD$  是以  $B$  為圓心、 $AB$  為半徑畫出的。弧  $AE$  是以  $C$  為圓心、 $AC$  為半徑畫出的。

求這個圖形的陰影面積。(取  $\pi = 3$ )



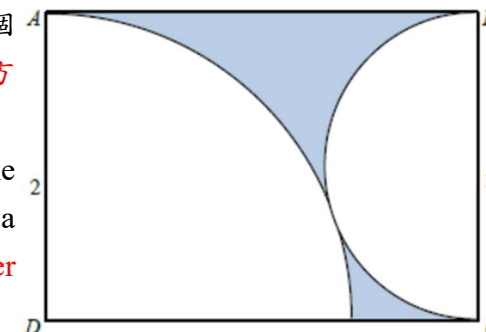
In the above figure,  $ABC$  is an isosceles triangle, where  $\angle A = 90^\circ$  and  $AB = 2$ . The figure includes three arcs: arc  $BFC$ , arc  $AD$ , and arc  $AE$ . Arc  $BFC$  has a radius of  $AB$  and is drawn from centre  $A$ . Arc  $AD$  is drawn from centre  $B$  with radius  $AB$ , while arc  $AE$  is drawn from centre  $C$  with radius  $AC$ . Find the area of this shaded region. (Take  $\pi = 3$ )

**2024 FG4.4**

右圖空白部分由一個四分之一圓和一個半圓互相外切組成。 $ABCD$  是一個長方形。求陰影部分的面積。

The unshaded part in the diagram on the right is made up of a quarter-circle and a semi-circle which touch each other externally.  $ABCD$  is a rectangle.

Find the area of the shaded part.



**Answer**

1983 FI4.4 $57^\circ$	1986 FI1.1 6	1988 FI3.2 6	1990 HI18 1 : 2	1994 HI9 6
1998 HG8 1	1998 FG1.1 4	1998 FG4.2 90	1999 HI1 1	1999 FI2.3 1
2000 FG4.2 3	2001 HI10 36	2004 HI6 12.5	2005 HI8 1	2006 FI1.2 $\frac{1}{2}$
2006 FI3.2 30	2008 FI3.3 45	2009 FG3.4 $5 - 2\sqrt{3}$	2009 FG4.2 $\frac{1}{2}$	2014 FI2.2 24
2019 FG4.1 24	2023 FG1.3 2	2024 FG4.4 $4\sqrt{2} - \frac{3\pi}{2}$		