Geometry 2: Circle

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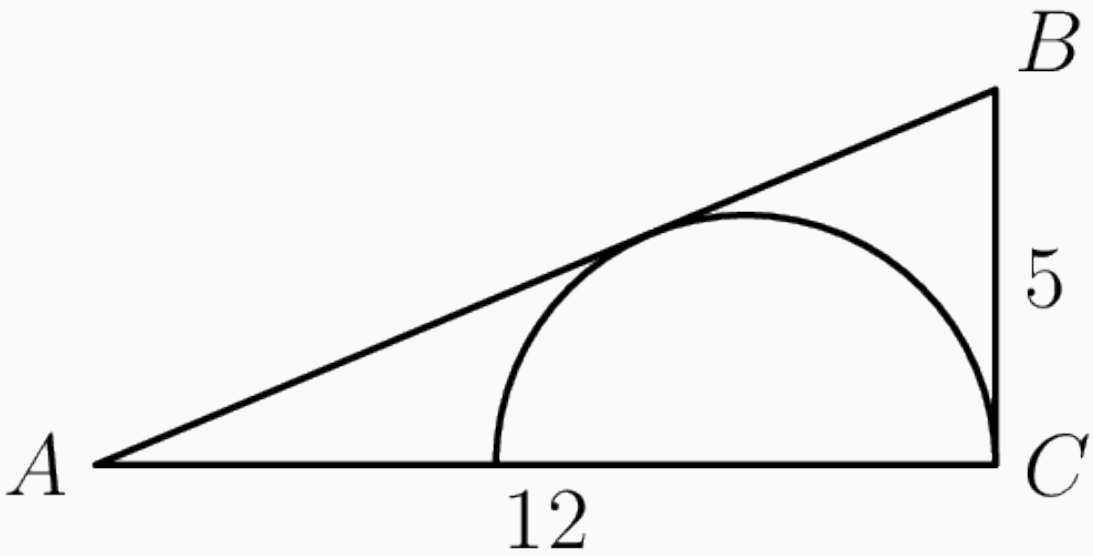
Semi-Circle 1

Question

In the right triangle ABC, $AC = 12$, $BC = 5$, and angle C is a right angle. A semicircle is inscribed in the triangle as shown. What is the radius of the semicircle?

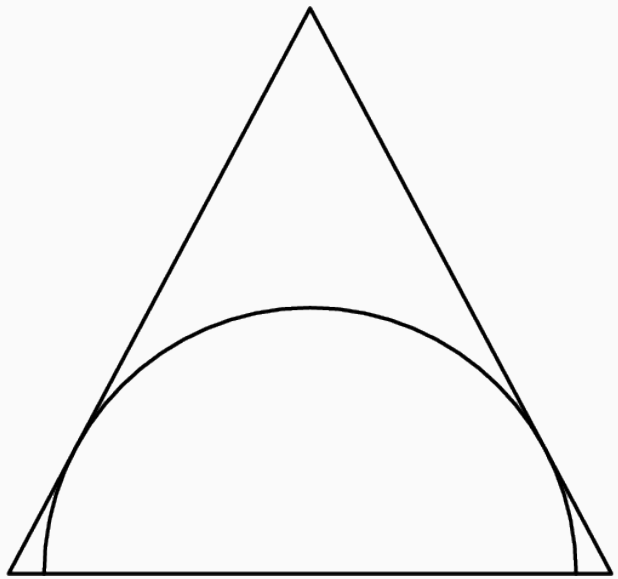
在直角三角形 ABC 中, $AC = 12$, $BC = 5$, 角 C 是一个直角. 如图所示，三角形内嵌了一个半圆, 求半圆的半径.



Semi-Circle 2

Question

A semicircle is inscribed in an isosceles triangle with base 16 and height 15 so that the diameter of the semicircle is contained in the base of the triangle as shown. What is the radius of the semicircle?
一个半圆内嵌在一个底 16 高 15 的等腰三角形中，这样半圆的直径就包含在三角形的底中, 求半圆半径.

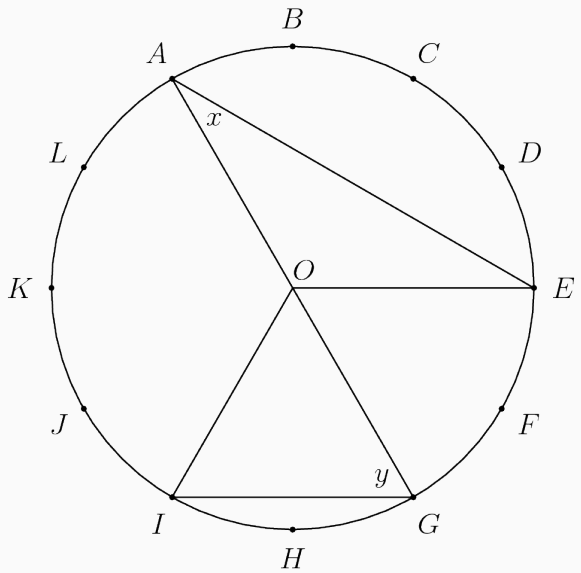


Circle-1

Question (AMC 8, 2014-15)

The circumference of the circle with center O is divided into 12 equal arcs, marked the letters A through L as seen below. What is the number of degrees in the sum of the angles x and y?

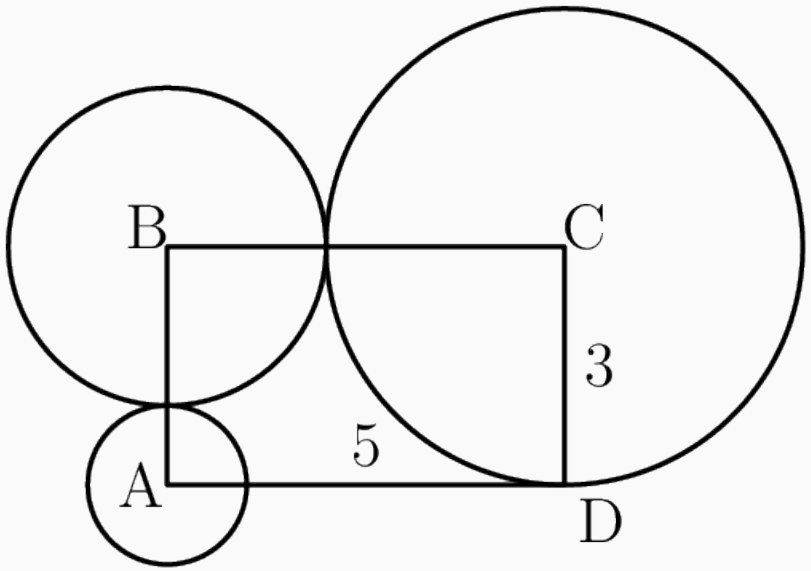
将圆等分为 12 份, 求 x 和 y 的角度之和.



Circle-2

Question (AMC 8, 2014-20)

$CD = 3$, $DA = 5$. 圆心为 A 的圆半径为 1, 圆心为 B 的圆半径为 2, 圆心为 C 的圆半径为 3, 求被三个圆割剩下的矩形面积.

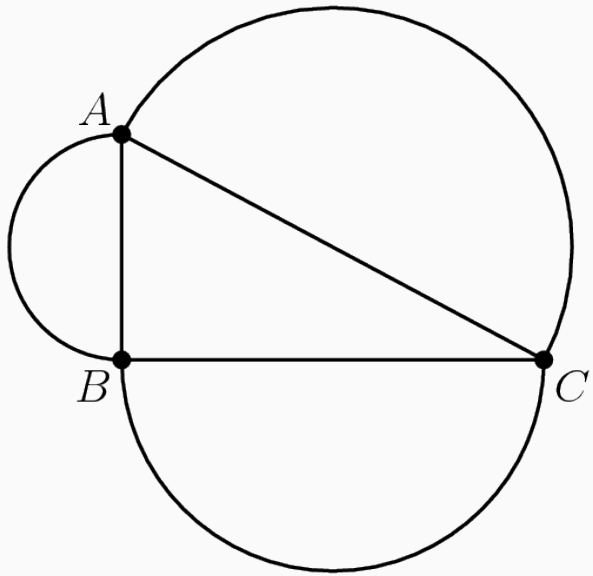


Circle-3

Question (AMC 8, 2013-23)

Angle ABC of $\triangle ABC$ is a right angle. The sides of $\triangle ABC$ are the diameters of semicircles as shown. The area of the semicircle on $\overline{AB}$ equals 8π, and the arc of the semicircle on $\overline{AC}$ has length 8.5π. What is the radius of the semicircle on $\overline{BC}$?

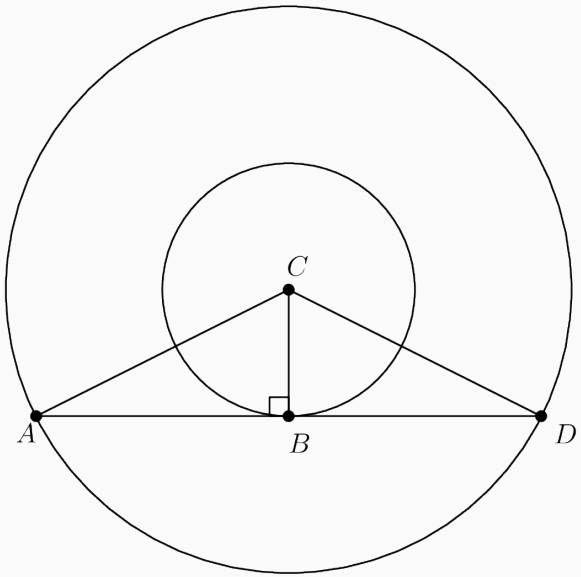
以 AB 为直径的半圆面积为 8π, 圆弧 AC 长为 8.5π, 求 BC 的长度.



Circle-4

Question (AMC 8, 2010-19)

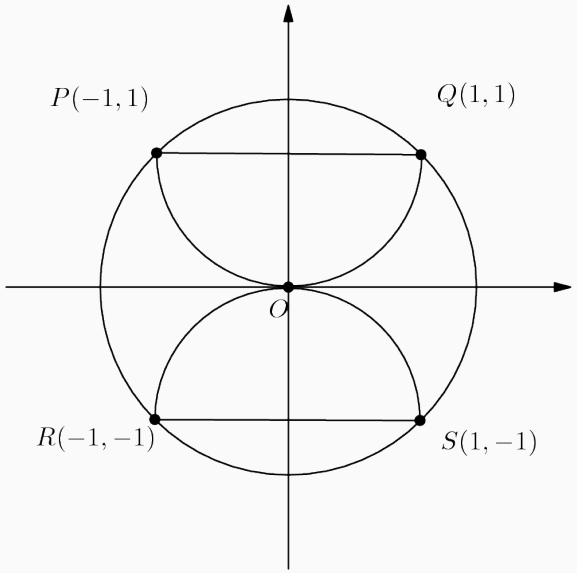
如图, $AC = 10$, $AD = 16$, 求两圆中间圆环的面积.



Circle-5

Question (AMC 8, 2010-23)

求两个半圆面积之和与大圆面积之比.



更多资源

想探索更多数学或者数学竞赛相关知识, 有如下书目可以参考: [3],[1],[2].


Harold B.Reiter and Jonathan M.Kane.
美国数学竞赛指南.
世界图书出版社, 2021.


冯荣权 和宋春伟.
组合数学.
北京大学出版社, 2021.


潘承洞 和潘承彪.
初等数论.
北京大学出版社, 2003.

获取数学相关工具和网站:

- MathStackExchange(*https://math.stackexchange.com*)
- AoPS(*https://artofproblemsolving.com/wiki/index.php*)
- Geogebra(*https://www.geogebra.org/download*)

数学内容排版软件: Latex(课件均由 Latex 制作)

数学相关编程工具: C++,Python, Matlab.