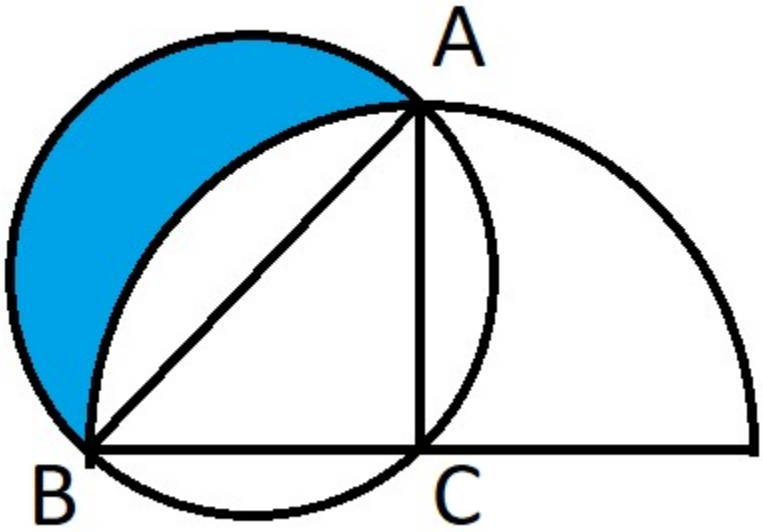
Question:



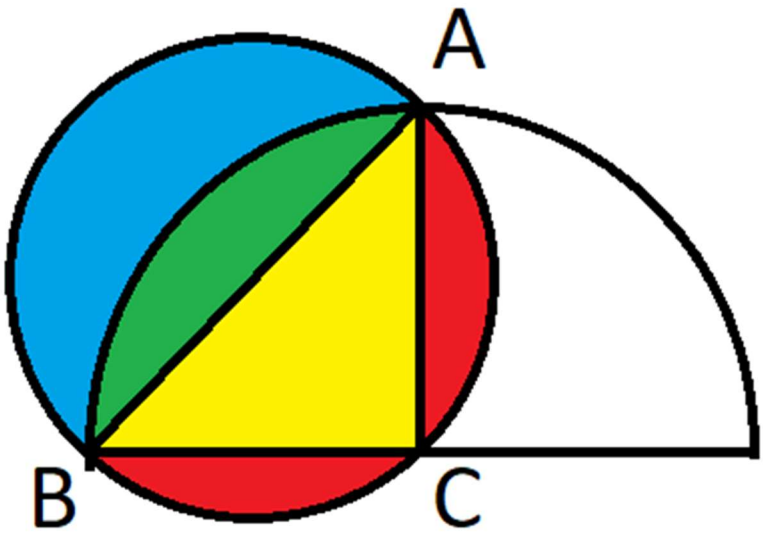
BC = AC = 1
ACB is a right angle.
What is the area of the blue region?

Answer:

½

Solution:

Let's use the following diagram to explain the solution.



We're given AC=BC=1. By the Pythagorean formula, AB = $\sqrt{2}$.

Consider the circle consisting of all the colored pieces. It has radius $\sqrt{2}$ / 2, so the area is π/2.

Next, consider the circle with radius AC. That circle has area equal to π. One quarter of that area is the yellow and green pieces, which equals π/4.

Next, consider the circular segments in red. The square inscribed in the middle of the circle with diameter AB has an area of 1.

We already showed the area of that circle is π/2. To get the area of all four circular segments, subtract the area of the square from the circle:

$\pi/2 - 1 = (\pi - 2)/2$

The area of two red circular segments is half of that, or $(\pi - 2)/4$.

As a review:

Circle with all colors = π/2.

Green + yellow = π/4.

Two reds = $(\pi - 2)/4$

To get the answer, subtract the green yellow and reds from the whole colored circle:

$\pi/2 - \pi/4 - (\pi - 2)/4 =$

$\pi/4 - \pi/4 + 2/4 =$

½