Problem of the Week - September 12-19, 2005

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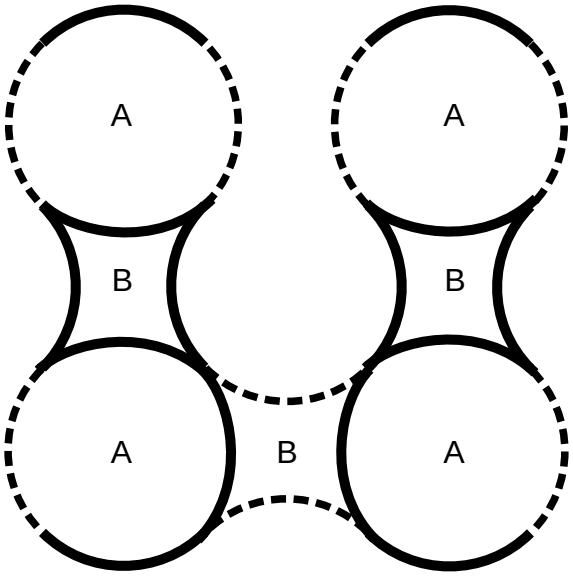
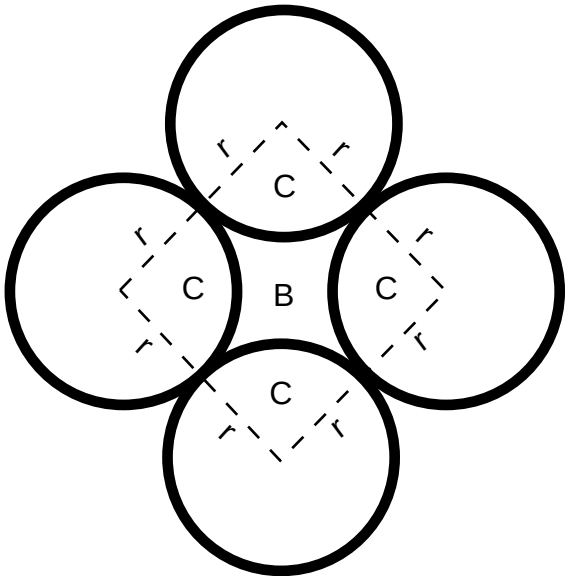
Separating the given drawing into pieces we have the figure:



And the area for the U-shaped figure can be calculated as the sum of four circles of radius 1 identified with the letters A and the three shapes identified with the letter B.

The shape B can be redraw as in the figure below:



and the area can be calculated as the subtraction of the area of the square with side 2r and the four shapes identified as C.

Area of C = $A_C = \frac{\pi r^2}{4}$

Area of the square = $A_S = 4r^2$

Area of B = $A_B = A_S - 4 * A_C = 4r^2 - 4\frac{\pi r^2}{4}$

So, the total area of the U-shaped figure can be calculated as:

Area of each circle A = $A_A = \pi r^2$

Area of each shape B = $A_B = 4r^2 - 4\frac{\pi r^2}{4}$

Total area = $A = 4 * A_A + 3 * A_B = 4\pi r^2 + 3(4r^2 - 4\frac{\pi r^2}{4})$

$= 4\pi r^2 + 12r^2 - 3\pi r^2 =$

$= \pi r^2 + 12r^2$

As $r = 1$: Total area = $\pi + 12$