

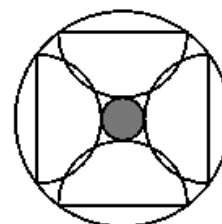
Question

Question ID: 890



20. The diagram shows four semicircles symmetrically placed between two circles. The shaded circle has area 4 and each semicircle has area 18. What is the area of the outer circle?

A $72\sqrt{2}$ B 100 C 98 D 96 E $32\sqrt{3}$



0890



©UKMT



Answer

20. **B** Let r_1 , r_2 and r_3 be the radii of the shaded circle, semicircles and outer circle respectively. A right-angled triangle can be formed with sides r_3 , $(r_1 + r_2)$ and r_2 .
Hence, by Pythagoras' Theorem, $r_3^2 = (r_1 + r_2)^2 + r_2^2$.
Now $\pi r_1^2 = 4$, hence $r_1 = 2/\sqrt{\pi}$. Likewise $r_2 = 6/\sqrt{\pi}$.
Hence $r_2 = 3r_1$ so that $r_3^2 = (r_1 + 3r_1)^2 + (3r_1)^2 = 25r_1^2$. Thus the required area is $25 \times 4 = 100$.

