**CALCULUS EXCELLENCE QUESTION.**

A 40 cm piece of wire is cut into two pieces.

The first piece is shaped into a CIRCLE of area A, and the second piece into a SQUARE of area B.

Find the minimum value of the total area A + B.

***Let the length of the circumference = x***

***So that 40 – x is left to make the square.***

***If circumf = x then 2πr = x so r = x/(2π)***

***Area A + B = πr2 + (40 – x)2***

***16***

***AREA = π x2 + 1600 – 80x + x2 = x2 + 100 – 5x + x2 40 – x***

***4π2 16 4π 16 4***

***d(Area) = x – 5 + x = 0 for max Area***

***dx 2π 8 40 – x***

***4***

***x( 1 + 1) = 5***

***2π 8***

***x ×0.28415 = 5***

***x = 17.6 cm so r = 2.8***

***So Min Area = π×2.82 + 5.62 = 56 cm2***