A piece of rope that is 18 feet long is cut into pieces. One piece is used to form a circle and the other used to form a square. Write a function *f* representing the area of the circle as a function of the length of one side of the square *s*.

Hint : If C is the diameter of the circle and P is the perimeter of the square, then C + P = 18.

Answer

 $f(s) = (9-2s)^2/\pi$, the area of the circle as a function of the length of one side of the square.

Explanation



$$\begin{split} f(s) &= \pi r^2 \text{ ; substitute equation 1 to the } r \\ &= \pi ((9\text{-}2s)/\pi))^2 \\ &= \pi (9\text{-}2s)^2/\pi^2 \\ &= \pi (81\text{-}36s\text{+}4s^2)/\pi^2 \\ f(s) &= (81\text{-}36s\text{+}4s^2)/\pi \\ f(s) &= (9\text{-}2s)^2/\pi \text{ , the area of the circle as a function of the length of one side of the square.} \end{split}$$