

$$\Rightarrow x + y = \frac{440}{\pi} \Rightarrow x + y = \frac{440 \times 7}{22} \Rightarrow x + y = 140$$
$$\Rightarrow y = 140 - x \quad \text{----- (i)}$$

Area of rectangular football field $A = x y$

$$\Rightarrow A = x(140 - x) = 140x - x^2$$

Differentiating w.r.t. x , $\frac{dA}{dx} = 140 - 2x$

and $\frac{d^2A}{dx^2} = -2 < 0$

\therefore for maximum rectangular area, $\frac{dA}{dx} = 0 \Rightarrow 140 - 2x = 0$
 $\Rightarrow x = 70$

And $y = 140 - x = 140 - 70 = 70$

Area of the football ground $A = xy = 70 \times 70 = 4900 \text{ m}^2$

Length and breadth of the football ground is 70m and 70 m respectively and its maximum area = 4900 m²

tapatisclasses.in