

$$\text{Area of } \theta \text{ segment} = \text{Area of sector} - \theta \text{ triangle}$$

$$= \frac{1}{2} (x^2 + y^2) \tan^{-1}\left(\frac{y}{x}\right) - \frac{1}{2} \cancel{xy} x$$

$$\text{Area of segment} = \frac{1}{2} ((1-x)^2 + y^2) \tan^{-1}\left(\frac{y}{1-x}\right) - \frac{1}{2} (1-x)y$$

$$\Rightarrow A = \frac{1}{2} \left[(x^2 + y^2) \left(\tan^{-1}\left(\frac{y}{x}\right) - xy \right) + ((1-x)^2 + y^2) \left(\tan^{-1}\left(\frac{y}{1-x}\right) - (1-x)y \right) \right]$$

$$= \frac{1}{2} \left[\tan^{-1}\left(\frac{y}{x}\right) (x^2 + y^2) + ((1-x)^2 + y^2) \tan^{-1}\left(\frac{y}{1-x}\right) - y + xy - x y \right]$$

$$= \frac{1}{2} \left[(x^2 + y^2) \tan^{-1}\left(\frac{y}{x}\right) + ((1-x)^2 + y^2) \tan^{-1}\left(\frac{y}{1-x}\right) - y \right]$$

$$\Rightarrow \text{Answer} = \frac{\pi}{4} [1 + 2x^2 + 2y^2 - 2x] -$$