

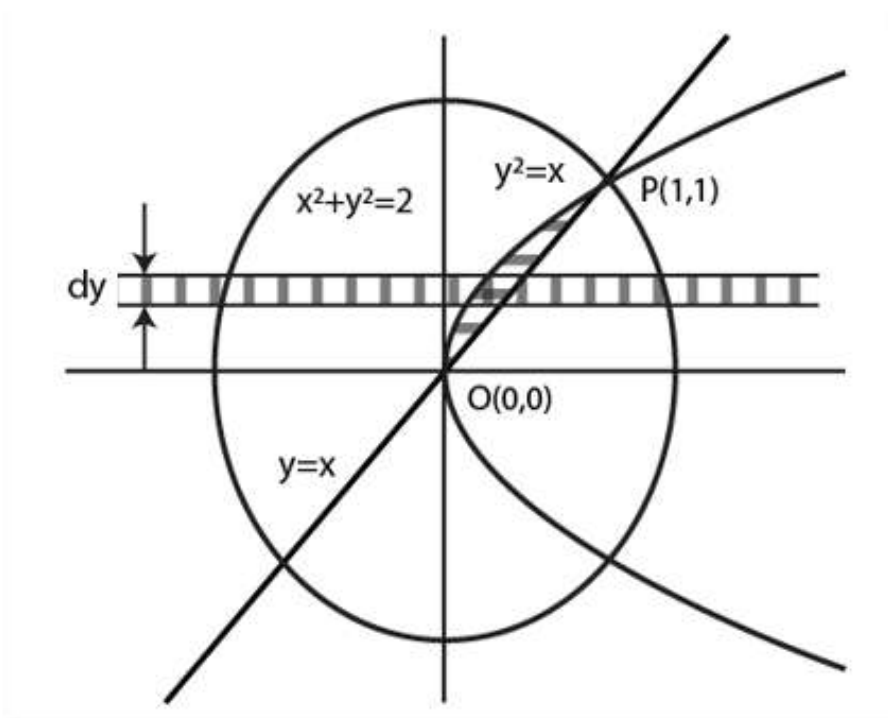
**Question 12:** The area of the region, enclosed by the circle  $x^2 + y^2 = 2$  which is not common to the region bounded by the parabola  $y^2 = x$  and the straight line  $y = x$ , is

- (a)  $\frac{1}{3}(12\pi - 1)$
- (b)  $\frac{1}{6}(12\pi - 1)$
- (c)  $\frac{1}{3}(6\pi - 1)$
- (d)  $\frac{1}{6}(24\pi - 1)$

**Solution:**

Answer: (b)

Explanation:



Required Area = Area of the circle - Area bounded by given line and parabola

$$= \pi r^2 -$$

$$\int_0^1 (y - y^2) dy$$

$$= 2\pi -$$

$$\left( \frac{y^2}{2} - \frac{y^3}{3} \right) \Big|_0^1$$

$$= 2\pi - \frac{1}{6}$$

$$= \frac{1}{6}(12\pi - 1) \text{ sq. units.}$$