

Que 5:

Let $g(x) = \cos x^2$, $f(x) = \sqrt{x}$, and α, β ($\alpha < \beta$) be the roots of the quadratic equation $18x^2 - 9\pi x + \pi^2 = 0$. Then the area (in sq. units)

bounded by the curve $y = (g \circ f)(x)$ and the lines $x = \alpha, x = \beta$ and $y = 0$, is :

[Main 2018]

- (a) $\frac{1}{2}(\sqrt{3} + 1)$
- (b) $\frac{1}{2}(\sqrt{3} - \sqrt{2})$
- (c) $\frac{1}{2}(\sqrt{2} - 1)$
- (d) $\frac{1}{2}(\sqrt{3} - 1)$

solutions:

4. (d) Here, $18x^2 - 9\pi x + \pi^2 = 0$

$$\Rightarrow (3x - \pi)(6x - \pi) = 0 \Rightarrow \alpha = \frac{\pi}{6}, \beta = \frac{\pi}{3}$$

Also, $g \circ f(x) = \cos x$

$$\therefore \text{Req. area} = \int_{\pi/6}^{\pi/3} \cos x dx = \frac{\sqrt{3} - 1}{2}$$