

Que 2:

1. The area (in sq. units) of the region $A = \{(x, y) : (x-1)[x] \leq y \leq 2\sqrt{x}, 0 \leq x \leq 2\}$, where $[t]$ denotes the greatest integer function, is :

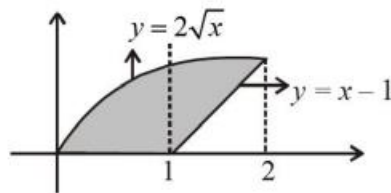
[Main Sep. 05, 2020 (II)]

- (a) $\frac{8}{3}\sqrt{2} - \frac{1}{2}$
(b) $\frac{4}{3}\sqrt{2} + 1$
(c) $\frac{8}{3}\sqrt{2} - 1$
(d) $\frac{4}{3}\sqrt{2} - \frac{1}{2}$

solution:

- (a) $[x] = 0$ when $x \in [0, 1)$ and $[x] = 1$ when $x \in [1, 2)$

$$y = \begin{cases} 0 & 0 \leq x < 1 \\ x-1 & 1 \leq x < 2 \end{cases}$$



$$\therefore A = \int_0^2 2\sqrt{x} dx - \frac{1}{2}(1)(1) = \frac{4x^{3/2}}{3} \Big|_0^2 - \frac{1}{2} = \frac{8\sqrt{2}}{3} - \frac{1}{2}$$