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The area of the planar region bounded by the curves $x = 6y^2 - 2$ and $x = 2y^2$ is

(a) $\frac{\sqrt{2}}{3}$

(b) $\frac{2\sqrt{2}}{3}$

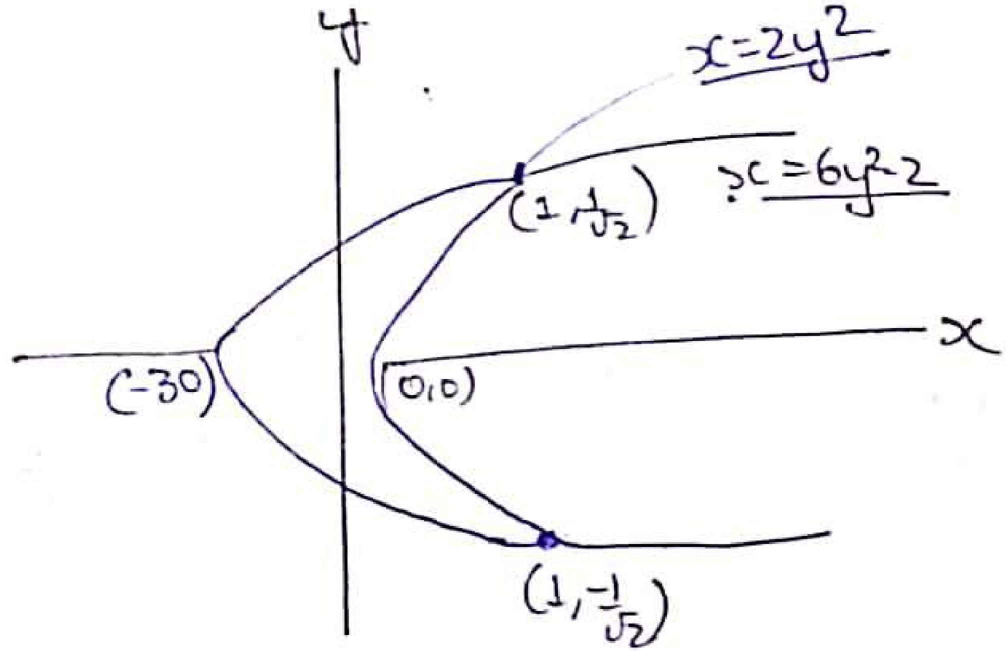
(c) $\frac{4\sqrt{2}}{3}$

(d) $\sqrt{2}$

Set-C

[C]

1) Area $= \int_{y=\frac{-1}{\sqrt{2}}}^{1/2} \int_{x=6y^2-2}^{2y^2}$ $\left[\because \text{Area} = \iint_D dx\,dy\right]$.



$= 2\int_0^{1/\sqrt{2}} (2-4y^2)\, dy$

$= \frac{4\sqrt{2}}{3}$.

5

Let $f : \mathbb{R} \to \mathbb{R}$ be a $f(x) = \int_{-5}^{x} (t-1)^3\, dt$. In which of the following intervals(s), f takes the value 1?

(a) If $f(x) \le g(x)$ for all $x \in [0, 1]$, then $\sup R(f) \le \inf R(g)$

(b) If $f(x) \le g(x)$ for some $x \in [0, 1]$, then $\inf R(f) \le \sup R(g)$

(c) If $f(x) \le g(y)$ for some $x, y \in [0, 1]$, then $\inf R(f) \le \sup R(g)$

(d) If $f(x) \le g(y)$ for all $x, y \in [0, 1]$, then $\sup R(f) \le \inf R(g)$

[A, C, D]

2) Here $f(x) = \int_{-5}^{x} (t-1)^3 \, dt$

$$\Rightarrow \frac{(x-1)^4}{4} - 324.$$

$f(x) = 1$

$\Rightarrow (x-4)^4 = 1300$; $x \simeq 7, -5$

6

Let C be the straight line segment from $P(0, \pi)$ to $Q\left(4, \frac{\pi}{2}\right)$, in the xy-plane. Then the value of

$\int_C e^x (\cos y\,dx - \sin y\,dy)$ is ______ subjective

3) Let $I = \int_C e^x (\cos y\, dx - \sin y\, dy)$.

[where c is straight line segment from $P(0,\pi)$ to $Q(4, \frac{\pi}{2})$ in x, y, plane].

Now, $I = \int_C d(e^x \cos y) = \left[e^y \cos y\right]_{(0,\pi)}^{(4,\frac{\pi}{2})}$

$= e^4 \cos\frac{\pi}{2} - \cos(\pi)$

$\Rightarrow -(-1) = \underline{\underline{1}}$ Answer.