

Date Planned : / /	Daily Tutorial Sheet - 8	Expected Duration: 90 Min
Actual Date of Attempt : / /	JEE Advanced (Archive)	Exact Duration :

Let O(0, 0), A(2, 0) and $B\left(1, \frac{1}{\sqrt{3}}\right)$ be the vertices of a triangle. Let R be the region consisting of all those 71. points P inside $\triangle OAB$ which satisfy $d(P, OA) \ge \min\{d(P, OB), d(P, AB)\}\$, where d denotes the distance from the point to the corresponding line. Sketch the region R and find its area.

Paragraph for Questions 72 to 73



Consider the functions defined implicitly by the equation $y^3 - 3y + x = 0$ on various intervals in the real line. If $x \in (-\infty, -2) \cup (2, \infty)$, the equation implicitly defines a unique real-valued differentiable function y = f(x). If $x \in (-2, 2)$, the equation implicitly defines a unique real-valued differentiable function y = g(x) satisfying g(0) = 0.

If $f(-10\sqrt{2}) = 2\sqrt{2}$, then $f''(-10\sqrt{2})$ is equal to: (A) $\frac{4\sqrt{2}}{7^33^2}$ (B) $-\frac{4\sqrt{2}}{7^33^2}$ (C) $\frac{4\sqrt{2}}{7^33}$ (D) $-\frac{4\sqrt{2}}{7^33}$

(A)
$$\frac{4\sqrt{2}}{7^33^2}$$

(B)
$$-\frac{4}{7}$$

(c)
$$\frac{4\sqrt{2}}{7^{3}2}$$

(D)
$$-\frac{4\sqrt{2}}{7^33}$$

The area of the region bounded by the curve y = f(x), the X-axis and the lines x = a and x = b, where 73.

(A)
$$\int_{a}^{b} \frac{x}{3[\{f(x)\}^{2}-1]} dx + bf(b) - af(a)$$

$$\int_{a}^{b} \frac{x}{3\left[\left\{f(x)\right\}^{2} - 1\right]} dx + bf(b) - af(a) \qquad \textbf{(B)} \qquad -\int_{a}^{b} \frac{x}{3\left[\left\{f(x)\right\}^{2} - 1\right]} dx + bf(b) - af(a)$$

(C)
$$\int_{a}^{b} \frac{x}{3 \left[\left\{ f(x) \right\}^{2} - 1 \right]} dx - bf(b) + af(a)$$

$$\int_{a}^{b} \frac{x}{3\left[\left\{f(x)\right\}^{2} - 1\right]} dx - bf(b) + af(a) \qquad \textbf{(D)} \qquad -\int_{a}^{b} \frac{x}{3\left[\left\{f(x)\right\}^{2} - 1\right]} dx - bf(b) + af(a)$$

The area enclosed by the curves $y = \sin x + \cos x$ and $y = \left|\cos x - \sin x\right|$ over the interval $\left|0, \frac{\pi}{2}\right|$ is: 74.

(A)
$$4(\sqrt{2}-1)$$

(B)
$$2\sqrt{2}(\sqrt{2}-1)$$

(C)
$$2(\sqrt{2} + 1)$$

$$4(\sqrt{2}-1)$$
 (B) $2\sqrt{2}(\sqrt{2}-1)$ (C) $2(\sqrt{2}+1)$ (D) $2\sqrt{2}(\sqrt{2}+1)$

Let $f:[-1,2] \to [0,\infty)$ be a continuous function such that f(x) = f(1-x), $\forall x \in [-1,2]$ **75**.

If $R_1 = \int_{a}^{2} x \ f(x) dx$ and R_2 are the area of the region bounded by y = f(x), x = -1, x = 2 and the X-axis.

Then:

(A)
$$R_1 = 2R_2$$

B)
$$R_1 = 3R$$

$$R_1 = 2R_2$$
 (B) $R_1 = 3R_2$ (C) $2R_1 = R_2$ (D) $3R_1 = R_2$

$$3R_1 = R_2$$

If the straight line x = b divide the area enclosed by $y = (1 - x)^2$, y = 0 and x = 0 into two parts 76.

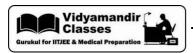
$$R_1(0 \le x \le b)$$
 and $R_2(b \le x \le 1)$ such that $R_1 - R_2 = \frac{1}{4}$. Then, *b* equals: (2011)

76

(A)
$$\frac{3}{4}$$

(C)
$$\frac{1}{3}$$

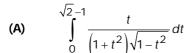
(D)
$$\frac{1}{4}$$



The area of the region between the curves $y = \sqrt{\frac{1 + \sin x}{\cos x}}$ and $y = \sqrt{\frac{1 - \sin x}{\cos x}}$ bounded by the lines **77**.

x = 0 and $x = \frac{\pi}{4}$ is:

(2008)



(B) $\int_{0}^{\sqrt{2}-1} \frac{4t}{(1+t^2)\sqrt{1-t^2}} dt$

(C)
$$\int_{0}^{\sqrt{2}+1} \frac{4t}{(1+t^2)\sqrt{1-t^2}} dt$$

(D) $\int_{0}^{\sqrt{2}+1} \frac{t}{(1+t^2)\sqrt{1-t^2}} dt$

If S be the area of the region enclosed by $y = e^{-x^2}$, y = 0, x = 0 and x = 1. Then: (2012) (A) $S \ge \frac{1}{e}$ (B) $S \ge 1 - \frac{1}{e}$ (C) $S \le \frac{1}{4} \left(1 + \frac{1}{\sqrt{e}} \right)$ (D) $S \le \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{e}} \left(1 - \frac{1}{\sqrt{2}} \right)$ *78.

- Area of the region bounded by the curve $y = e^{x}$ and lines x = 0 and y = e is: *79.

(2009)

(A)

(B) $\int_{1}^{e} \ln(e+1-y) \, dy$

 $e - \int_{0}^{1} e^{x} dx$ (C)

- **(D)** $\int_{1}^{e} \ln y dy$
- For which of the following values of m, is the area of the region bounded by the curve $y = x x^2$ and the line *80. y = mx equals $\frac{9}{2}$? (1999)
 - (A)
- (B) -2
- (C) 2
- (D) 4