

# MATHEMATICS LECTURES FOR IIT-JEE BY MANISH KALIA

## Area

### JEE-MAINS (PREVIOUS YEAR)

#### MCQ – Single Correct

1. The area ( in sq. units) of the region  $\{(x,y):x \geq 0, x + y \leq 3, x^2 \leq 4y \text{ and } y \leq 1 + \sqrt{x}\}$  is :
- (1)  $\frac{59}{12}$  (2)  $\frac{3}{2}$   
(3)  $\frac{7}{3}$  (4)  $\frac{5}{2}$  [2017]
2. The area ( in sq. units ) of the region  $\{(x,y) : y^2 \geq 2x \text{ and } x^2 + y^2 \leq 4x, x \geq 0, y \geq 0\}$  is :
- (1)  $\pi - \frac{8}{3}$  (2)  $\pi - \frac{4\sqrt{2}}{3}$   
(3)  $\frac{\pi}{2} - \frac{2\sqrt{2}}{3}$  (4)  $\pi - \frac{4}{3}$  [2016]
3. The area ( in square units ) of the region described by  $\{(x,y) : y^2 \leq 2x \text{ and } y \geq 4x - 1\}$  is :
- (1)  $\frac{5}{64}$  (2)  $\frac{15}{64}$   
(3)  $\frac{9}{32}$  (4)  $\frac{7}{32}$  [2015]
4. The area of the region described by  $A = \{(x,y) : x^2 + y^2 \leq 1 \text{ and } y^2 \leq 1 - x\}$  is [2014]
- (1)  $\frac{\pi}{2} + \frac{4}{3}$  (2)  $\frac{\pi}{2} - \frac{4}{3}$   
(3)  $\frac{\pi}{2} - \frac{2}{3}$  (4)  $\frac{\pi}{2} + \frac{2}{3}$
5. The area ( in square units ) bounded by the curves  $y = \sqrt{x}, 2y - x + 3 = 0$ , x-axis, and lying in the first quadrant is
- (1) 36 (2) 18

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- (3)  $\frac{27}{4}$  (4) 9 [2013]
6. The area bounded between the parabola  $x^2 = \frac{y}{4}$  and  $x^2 = 9y$  and the straight line  $y = 2$  is
- (1)  $\frac{20\sqrt{2}}{3}$  (2)  $10\sqrt{2}$
- (3)  $20\sqrt{2}$  (4)  $\frac{10\sqrt{2}}{3}$  [2012]
7. The area bounded by the curves  $y^2 = 4x$  and  $x^2 = 4y$  is
- (1)  $8/3$  (2) 0
- (3)  $32/3$  (4)  $16/3$  [2011]
8. The area bounded by the curves  $y = \cos x$  and  $y = \sin x$  between the ordinates  $x = 0$  and  $x = 3\pi/2$  is
- (1)  $4\sqrt{2} + 2$  (2)  $4\sqrt{2} - 1$
- (3)  $4\sqrt{2} + 1$  (4)  $4\sqrt{2} - 2$  [2010]
9. The area of the plane region bounded by the curves  $x + 2y^2 = 0$  and  $x + 3y^2 = 1$  is equal to
- (1)  $5/3$  (2)  $1/3$
- (3)  $2/3$  (4)  $4/3$  [2008]
10. The area enclosed between the curve  $y = \log_e(x + e)$  and the coordinate axes is
- (1) 1 (2) 2
- (3) 3 (4) 4 [2005]
11. The parabolas  $y^2 = 4x$  and  $x^2 = 4y$  divide the square region bounded by the lines  $x = 4$ ,  $y = 4$  and the coordinate axes. If  $S_1, S_2, S_3$  are respectively the areas of these parts numbered from top to bottom; then  $S_1 : S_2 : S_3$  is
- (1) 1 : 2 : 1 (2) 1 : 2 : 3
- (3) 2 : 1 : 2 (4) 1 : 1 : 1 [2005]

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12. Let  $f(x)$  be a non-negative continuous function such that the area bounded by the curve  $y = f(x)$ , x-axis and the ordinates  $x = 3 : \sqrt{2}$  and  $x = \beta > \pi/4$  is  $\left( \beta \sin \beta + \frac{\pi}{4} \cos \beta + \sqrt{2}\beta \right)$ . Then  $f(\pi/2)$

is

(1)  $\left( \frac{\pi}{4} + \sqrt{2} - 1 \right)$

(2)  $\left( \frac{\pi}{4} - \sqrt{2} + 1 \right)$

(3)  $1 + \frac{1}{4.2!} + \frac{1}{16.4!} + \frac{1}{64.6!} + \dots$

(4)  $\left( 1 - \frac{\pi}{4} + \sqrt{2} \right)$

[2005]

13. The area of the region bounded by the curves  $y = |x-2|$ ,  $x = 1$ ,  $x = 3$  and the x-axis is

(1) 1

(2) 2

(3) 3

(4) 4

[2004]

14. The area of the region bounded by the curves  $y = |x - 1|$  and  $y = 3 - |x|$  is

(1) 2 sq units

(2) 3 sq units

(3) 4 sq units

(4) 6 sq units

[2003]

15. The area bounded by the curves  $y = \ln x$ ,  $y = \ln |x|$ ,  $y = |\ln x|$  and  $y = |\ln |x|$  is

(1) 4 sq. units

(2) 6 sq. units

(3) 10 sq. units

(4) none of these

[2002]