



### MATHS

## **BOOKS - JEE MAINS PREVIOUS YEAR**

# **APPLICATION OF DERIVATIVES**

#### Others

1. If p and q are positive real numbers such that  $p^2+q^2=1$  , then the maximum value of (p+q) is (1) 2 (2) 1/2 (3)  $rac{1}{\sqrt{2}}$  (4)  $\sqrt{2}$ 

2. A value of C for which the conclusion of Mean Value Theorem holds for the function  $f(x) = (\log)_e x$  on the interval [1, 3] is (1)  $2(\log)_3 e$  (2)  $\frac{1}{2}(\log)_e 3$  (3)  $(\log)_3 e$  (4)  $(\log)_e 3$ 

A.  $2\log_3 e$ 

$$\mathsf{B}.\,\frac{1}{2}\!\log_e 3$$

 $\mathsf{C}.\log_3 e$ 

 $D. \log_e 3$ 

#### Answer: null



**3.** A spherical balloon is filled with 4500p cubic meters of helium gas. If a leak in the balloon causes the gas to escape at the rate of  $72\pi$ cubic meters per minute, then the rate (in meters per minute) at which the radius of the balloon decreases 49 minutes after the leakage began is (1)  $\frac{9}{7}$  (2)  $\frac{7}{9}$  (3)  $\frac{2}{9}$  (4)  $\frac{9}{2}$ 

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4. The intercepts on x-axis made by tangents to the curve,  $y=\int_0^x |t|dt,\,x\in R,\,$  which are parallel to the line y=2x , are equal to (1)  $\pm 2$ 

(2)  $\pm 3$  (3)  $\pm 4$  (4)  $\pm 1$ 

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5. If f and g are differentiable functions in [0, 1] satisfying  $f(0)=2=g(1),\,g(0)=0$  and f(1)=6 , then for some  $c\in ]0,\,1[$  (1)

2f'(c) = g'(c) (2) 2f'(c) = 3g'(c) (3) f'(c) = g'(c) (4) f'(c) = 2g'(c)

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**6.** A bird is sitting on the top of a vertical pole 20 m high and its elevation from a point O on the ground is 45o. It flies off horizontally straight away from the point O. After one second, the elevation of the bird from O is reduced to 30o. Then the speed (in m/s) of the

bird is (1)  $40 \left(\sqrt{2}-1
ight)$  (2)  $40 \left(\sqrt{3}-2
ight)$  (3)

 $20\sqrt{2}$  (4)  $20ig(\sqrt{3}-1ig)$ 

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**7.** A wire of length 2 units is cut into two parts which are bent respectively to form a square of side = x units and a circle of radius = runits. If the sum of the areas of the square and the circle so formed is minimum, then : (1)  $2x=(\pi+4)r$  (2)  $(\pi+4)x=\pi r$  (3) x=2r(4) 2x = r



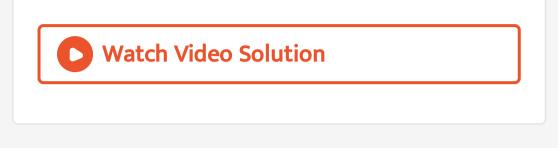
8. The radius of a circle, having minimum area, which touches the curve  $y = 4 - x^2$  and the lines, y = |x| is: (a)  $4(\sqrt{2} + 1)$  (b)  $2(\sqrt{2} + 1)$ (c)  $2(\sqrt{2} - 1)$  (d)  $4(\sqrt{2} - 1)$ 

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**9.** Twenty metres of wire is available for fencing off a flower-bed in the form of a circular sector. Then the maximum area (in

 $sq\dot{m}
ight)$  of the flower-bed is: 25 (2) 30 (3) 12.5 (4)

#### 10



10. The normal to the curve y(x-2)(x-3) = x + 6 at the point where the curve intersects the y-axis , passes through the point :  $\left(\frac{1}{2}, -\frac{1}{3}\right)$  (2)  $\left(\frac{1}{2}, \frac{1}{3}\right)$  (3)  $\left(-\frac{1}{2}, -\frac{1}{2}\right)$  (4)  $\left(\frac{1}{2}, \frac{1}{2}\right)$ A.  $\left(-\frac{1}{2}, -\frac{1}{2}\right)$ 

$$B.\left(\frac{1}{2},\frac{1}{2}\right)$$
$$C.\left(\frac{1}{2},-\frac{1}{3}\right)$$
$$D.\left(\frac{1}{2},\frac{1}{3}\right)$$

#### Answer: null

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