

India's Number 1 Education App

### MATHS

# **BOOKS - JEE MAINS PREVIOUS YEAR**

# **CONTINUITY AND DIFFERENTIABILITY**

#### Others

1. Let 
$$f(x) = \left\{ (x-1) rac{\sin 1}{x-1} ext{ if } x 
eq 10, ext{ if } x = 1 
ight.$$

. Then which one of the following is true? f is

differentiable at x = 0 and at x - 1 f is differentiable at x = 0 but not at x = 1 f is differentiable at x = 0 nor at x = 1 f is differentiable at x = 1 but not at x = 0

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**2.** Let y be an implicit function of x defined by

 $x^{2x} - 2x^x \cot y - 1 = 0$ . Then y (1) equals`

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3. The value of p and q for which the function

$$f(x) = egin{bmatrix} rac{\sin{(p+1)\,x} + \sin{x}}{x} & x < 0 \ q & x = 0 \ rac{\sqrt{x+x^2} - \sqrt{x}}{x^{3/2}} & x > 0 \end{bmatrix}$$
 is

continuous for all x in R , are : (1)

$$p = \frac{1}{2}, q = -\frac{3}{2}$$
(2)  $p = \frac{5}{2}, q = -\frac{1}{2}$ 
(3)  $p = -\frac{3}{2}, q = \frac{1}{2}$ 
(4)  $p = \frac{1}{2}, q = \frac{3}{2}$ 

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**4.** Let a, b R be such that the function f given by  $f(x) = \ln |x| + bx^2 + ax, x 
eq 0$  has extreme values at x = 1 and x = 2 . Statement 1: f has local maximum at x=1 and at x=2 . Statement 2:  $a = \frac{1}{2}$  and  $b = \frac{-1}{4}$  (1) Statement 1 is false, statement 2 is true (2) Statement 1 is true, statement 2 is true; statement 2 is a correct explanation for statement 1 (3) Statement 1 is true, statement 2 is true; statement 2 is not a correct explanation for statement 1 (4) Statement 1 is true, statement 2 is false



5. Consider the function  $f(x) = |x-2| + |x-5|, x \in R$  . Statement 1: f'(4) = 0 Statement 2: f is continuous in [2, 5], differentiable in (2, 5) and f(2) = f(5). (1) Statement 1 is false, statement 2 is true (2) Statement 1 is true, statement 2 is true; statement 2 is a correct explanation for statement 1 (3) Statement 1 is true, statement 2 is true; statement 2 is not a correct explanation

for statement 1 (4) Statement 1 is true,

statement 2 is false

6. For 
$$x \in R$$
,  $f(x) = |\log 2 - \sin x|$  and  
 $g(x) = f(f(x))$ , then  
(1)g is not differentiable at  $x = 0$   
(2)  $g'(0) = \cos(\log 2)$   
(3)  $g'(0) = -\cos(\log 2)$   
(4) g is differentiable at  $x = 0$  and  
 $g'(0) = -\sin(\log 2)$ 

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