JEE ADVANCED

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1.Multiple Choice Questions

1) Let f(x) be a polynomial function of second degree.If f(1)=f(−1) and a,b,c are in A.P, then $f'(a), f'(b), f'(c)$ are in [2003]

a) Arthemetic-Geometric Progression
b) A.P
c) G.P
d) H.P

2) If x=$e^{y+e^{y+e^{y+---\infty}}}$,$x > 0$, then $\frac{dy}{dx}$ is [2004]

a) $\frac{1+x}{x}$
b) $\frac{1}{x}$
c) $\frac{1-x}{x}$
d) $\frac{x}{1+x}$

3) The value of a for which the sum of the squares of the roots of the equation $x^2 - (a-2)x - a - 1 = 0$ assume the least value is [2005]

a) 1
b) 0
c) 3
d) 2

4) If the roots of the equation $x^2 - bx + c = 0$ be two consecutive integers, then $b^2 - 4c$ equals to [2005]

a) -2
b) 3
c) 2
d) 1

5) Let $f : R \longrightarrow R$ be a differentiable function having $f(2) = 6, f'(2) = (\frac{1}{48})$.Then $\lim_{x\to 2} \int_6^{f(x)} \frac{4t^3}{x-2} dt$ equals to [2005]

a) 24
b) 36
c) 12
d) 18

6) The set of points where $f(x) = \frac{x}{1+|x|}$ is differentiable is [2006]

a) $(-\infty, 0) \bigcup (0, \infty)$
b) $(-\infty, -1) \bigcup (-1, \infty)$
c) $(-\infty, \infty)$
d) $0, \infty$

7) If $x^m.y^n = x + y^{m+n}$,then $\frac{dy}{dx}$ is [2006]

a) $\frac{y}{x}$
b) $\frac{x+y}{xy}$
c) xy
d) $\frac{x}{y}$

8) Let y be an implicit function of x defined by $x^{2x} - 2x^x coty - 1 = 0$.Then $y'(1)$ equals [2009]

a) 1
b) log 2
c) -log 2
d) -1

9) Let $f : (-1, 1) \rightarrow \mathbf{R}$ be a differentiable function with$f(0) = -1$ and $f'(0) = 1$.Let $g(x) = [f(2f(x) + 2)]^2$.Then$g'(0) =$ [2010]

a) -4
b) 0
c) -2
d) 4

10) $\frac{d^2x}{dy^2}$equals: [JEE M 2013]

a) $-\left(\frac{d^2y}{dx^2}\right)^{-1}\left(\frac{dy}{dx}\right)^{-3}$

b) $\left(\frac{d^2y}{dx^2}\right)\left(\frac{dy}{dx}\right)^{-2}$
c) $-\left(\frac{d^2y}{dx^2}\right)\left(\frac{dy}{dx}\right)^{-3}$
d) $\left(\frac{d^2y}{dx^2}\right)^{-1}$

11) If $y = \sec(\tan^{-1} x)$,then $\frac{dy}{dx}$ at x=1 is equal to: [JEE M 2013]

a) $\frac{1}{\sqrt{2}}$
b) $\frac{1}{2}$
c) 1
d) $\sqrt{2}$

12) If g is the inverse of a function f and $f'(x)=\frac{1}{1+x^5}$,then $g'(x)$ is equal to: [JEE M 2014]

a) $\frac{1}{1+(g(x))^5}$
b) $1+(g(x))$
c) $1 + x^5$
d) $5x^4$

13) If x=-1 and x=2 are extreme points of $f(x) = \alpha \log|x| + \beta x^2 + x$ then [JEE M 2014]
a) $\alpha = 2, \beta = -\frac{1}{2}$
b) $\alpha = 2, \beta = \frac{1}{2}$
c) $\alpha = -6, \beta = \frac{1}{2}$
d) $\alpha = -6, \beta = -\frac{1}{2}$

14) If for x$\in \left(0, \frac{1}{4}\right)$,the derivative of $\tan^{-1}\left(\frac{6x\sqrt{2}}{1-9x^3}\right)$ is $\sqrt{x}.g(x)$,then g(x) equals: [JEE M 2017]

a) $\frac{3}{1+9x^3}$
b) $\frac{9}{1+9x^3}$
c) $\frac{3x\sqrt{x}}{1-9x^3}$
d) $\frac{3x}{1-9x^3}$