Chapter 5 Continuity and Differentiability

Important MCQs Questions

Question 1: The function f(x) = [ln(1+ax)-ln(1-bx)]/x, not defined at x=0. The value should be assigned to f at x=0, so that it is continuous at x =0, is

(a) a+b

(b) a-b

(c) b-a

(d) ln a+ ln b

Answers

(a) a+b

Question 2: If $x \sin(a+y) = \sin y$, then dy/dx is equal to

(a) [sin²(a+y)]/sin a

(b) sin a /[sin²(a+y)]

(c) [sin(a+y)]/sin a

(d) sin a /[sin(a+y)]

Answers

(a) $[\sin^2(a+y)]/\sin a$

Question 3: The function f(x) = [x], where [x] denotes the greatest integer function is continuous at:

(a) 4

- (b) -2
- (c) 1
- (d) 1.5

Answers

(d) 1.5

Question 4: Consider the following in respect of the function $f(x) = 10^x$:

- 1. Its domain is (∞, ∞)
- 2. It is a continuous function
- 3. It is differentiable at x = 0

Which of the above statements are correct?

(a) 1 and 2 only

- (b) 2 and 3 only
- (c) 1 and 3 only

(d) 1, 2 and 3

Answers

(d) 1, 2 and 3

Question 5: Let $f(x) = |\sin x|$. Then

(a) f is everywhere differentiable

- (b) f is everywhere continuous but not differentiable at $x = n\pi$, $n \in Z$.
- (c) f is everywhere continuous but not differentiable at x = (2n + 1), $n \in Z$.

(d) none of these

Answers

(b) f is everywhere continuous but not differentiable at x = $n\pi$, $n \in Z$.

Question 6: If the function $f(x) = (2x-\sin^{-1}x)/(2x+\tan^{-1}x)$ is continuous at each point of its domain, then the value of f(0) is

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

Answers

(a) 1/3

Question 7: If y = log $(\frac{1-x^2}{1+x^2})$ then $\frac{dy}{dx}$ is equal to: (a) $\frac{4x^3}{1-x^4}$ (b) $\frac{-4x}{1-x^4}$ (c) $\frac{1}{4-x^4}$ (d) $\frac{-4x^3}{1-x^4}$

Answers

(b)

Question 8:

If y = x tan y, then
$$\frac{dy}{dx}$$
 =
(a) $\frac{tanx}{x-x^2-y^2}$
(b) $\frac{y}{x-x^2-y^2}$
(c) $\frac{tany}{y-x}$
(d) $\frac{tanx}{x-y^2}$

Answer: (b)
$$\frac{y}{x-x^2-y^2}$$

Question 9: The value of c in Rolle's theorem for the function, $f(x) = \sin 2x$ in $[0, \pi/2]$ is

- (a) π/4
- (b) π/6
- (c) π/2
- (d) π/3

Answers

Option (a) $\pi/4$

Question 10:

If
$$\sec(\frac{x^2-2x}{x^2+1}) - y$$
 then $\frac{dy}{dx}$ is equal to
(a) $\frac{y*2}{x^2}$
(b) $\frac{2y\sqrt{y^2-1}(x^2+x-1)}{(x^2+1)^2}$
(c) $\frac{(x^2+x-1)}{y\sqrt{y^2-1}}$
(d) $\frac{x^2-y^2}{x^2+y^2}$

Answer: (b)
$$\frac{2y\sqrt{y^2-1}(x^2+x-1)}{(x^2+1)^2}$$